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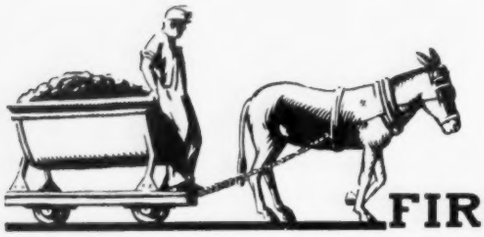
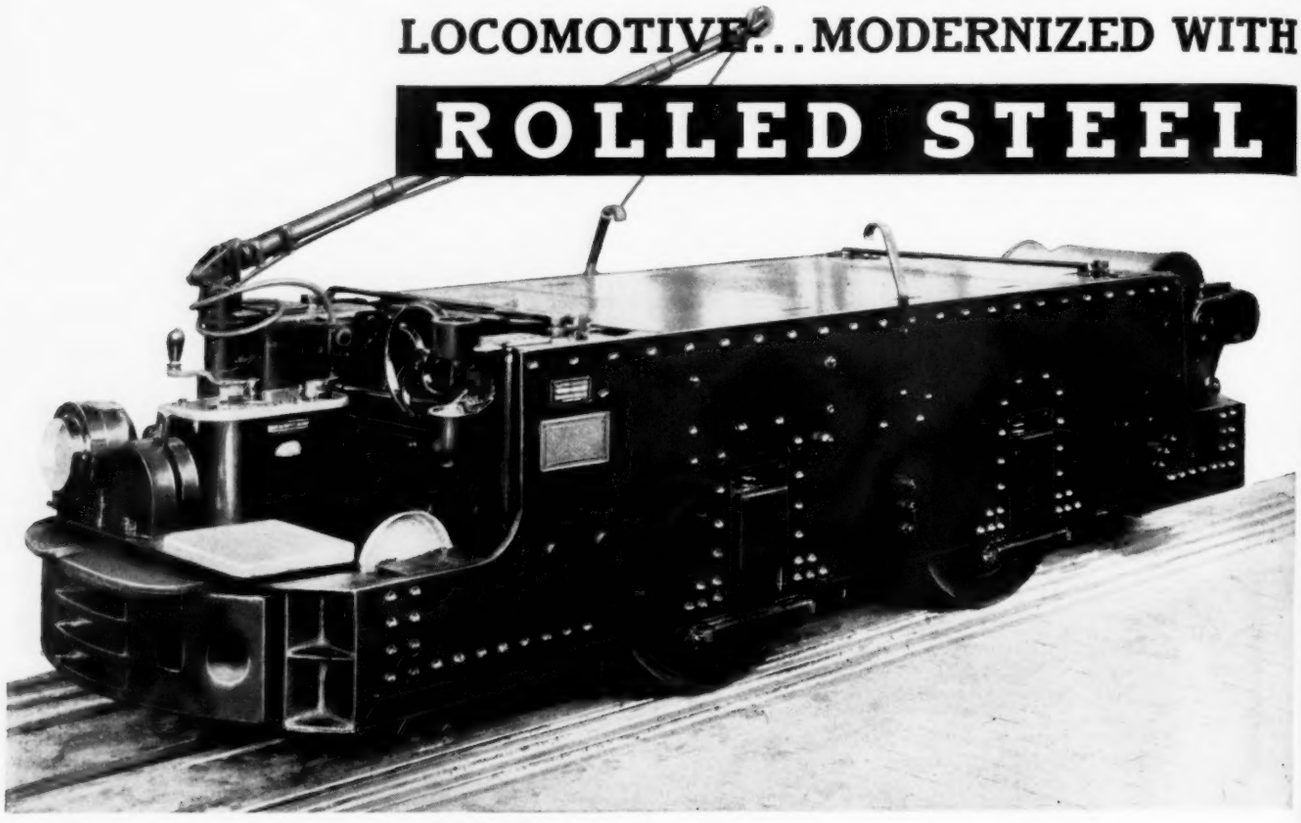


FIRST THE OLD MULE HIMSELF... THEN THE ELECTRIC MULE... NOW THE 1934 ELECTRIC MINE LOCOMOTIVE...MODERNIZED WITH ROLLED STEEL



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As the Editor Views the News

IN SPITE of the evidence of increasing chaos in the relations between government and industry, there still is hope that President Roosevelt may grasp the significance of the present impossible situation and will act to correct it. That hope lies in the belief that he cannot longer ignore the wreckage which has been caused by the bungling of his administration. It is the hope that the impotency of strangled business, the murder and destruction of new deal-inspired labor strife and the degeneration of national morale resulting therefrom will jolt him into an appreciation of realities.

• • •

Labor Strife Mounting

Last week the weakness of the new deal was emphasized most strongly by the developments in labor relations. Increasing resentment against the officers of law enforcement by the unthinking public; more brazen destruction of property, not only in the textile areas but throughout the length and breadth of the nation; and the thoughtless pouring of gasoline on the flames of discontent by the Hopkins, Perkins, Greens and Gormans are sweeping the nation to an eventuality which the complacent Chief Executive cannot ignore. The growing arrogance of organized union labor may precipitate a show-down, even before the November elections.

• • •

Efficiency Is NRA Need

Nothing of importance was decided at Hyde Park or Washington during the week to help correct the labor relations mess. The President, in declaring on Wednesday that whether labor should be represented by a majority rule or proportional representation depends a good deal upon the industry involved, simply uttered another weasel-worded statement which clouds rather than clarifies the national policy on collective bargaining. . . . As for the new plans for NRA, the proposal of an administrative or executive, legislative and judicial set-up will fall short of satisfying industry. Industrial code members want above all other things a continuing, consistent policy directed by competent administrators. To satisfy this desire, General Johnson must enlist more NRA officials who are dry behind the ears. At the moment efficiency is as important as policy.

• • •

Lesson of Morro Castle

In three cases since 1932, modern passenger liners have been gutted by fire with great loss of life. On all three—GEORGE PHILIPAR, ATLANTIQUE and MORRO CASTLE—the fire spread with great rapidity and the vessels were abandoned within from one-half to several hours after fire was discovered. On the other hand, thousands of vessels—many of them potential fire traps—have successfully withstood the hazard of fire, indicating that efficiency of management and ability of master and crew are important factors. Nevertheless, the danger of fire can be minimized and the responsibility on human shoulders lightened by employing steel (p. 10) more extensively in the superstructures of passenger liners. The MORRO CASTLE disaster may well mark the real beginning of fire-safe construction between decks.

• • •

Consumers Set Pace

In recent months many manufacturers of refrigerators, kitchen ranges, and other household appliances have introduced new models designed to fit the pocketbooks of low income groups. This is the most general move to gear industry to the consumer market yet attempted in this country. If, as now seems probable (p. 25), a steadily increasing portion of the work of the metalworking industries will be devoted to the manufacture of products sold direct to the public, is it not likely that the policy of designing to price limits may become more firmly established? This possibility is well worth the close attention of all executives of metalworking companies. . . . . A European commentator on trends in the architectural use of sheet metal (p. 35) declares that houses of the future will be designed for short life—like automobiles.

E. L. Shaner

Steel Used Decoratively for Interiors Aids Ship Safety

IN THE aftermath of the MORRO CASTLE *disaster the steel industry has an opportunity to be of service to humanity. Obviously, what burned in the* MORRO CASTLE *was not the steel hull or superstructure, but the interior. Marine design accepts steel as the base material for a ship, but tradition says that for public rooms and passenger quarters this steel must be concealed behind furring, wood paneling and trim, and other inflammable material. Steel is workable; it can be made decorative; there is no need to sacrifice its in-built safety which is superior to any other fire safeguard. President Roosevelt and Secretary of Commerce Roper propose that interior ship construction be steel; it already is largely steel, needing only artistic treatment. On this subject* STEEL *presents the views of A. H. Jansson, editor of Marine Review (also a Penton publication), a graduate naval architect, member of the Society of Naval Architects and Naval Engineers, who visualizes this opportunity for steel through the eyes of the marine expert.*

By A. H. Jansson

THE 137 men, women and children who perished when fire swept the Ward line steamer MORRO CASTLE off the New Jersey coast Sept. 8 will not have died in vain if the lessons of the disaster are heeded.

Many factors enter into the equation of safety against the ravages of fire at sea. Among these are the human element; the character of the individual; knowledge of and careful training in the tasks to be performed in an emergency; orderly, disciplined and co-ordinated action of the officers and crew.

Among these also are dependable mechanical appliances for automatic detection and the control and extinction of fire. Last and perhaps of greatest importance, because it is not dependent on other factors, is the design and construction to make the structure fireproof or, at least, so highly resistant that no fire could gain dangerous headway.

Traditions Must Be Broken

It is the last factor that we propose to consider and particularly the high fire resistance possible by the elimination of wood and other inflammable material and the substitution of steel and other metals for interior finishes and similar purposes throughout the vessel.

This calls for a breaking with tradition, custom and habit which have persisted since the days when wood was the only material of which ships were built. A very long way on the road of a complete rupture with the past has already been traveled.

The MORRO CASTLE, completed in August, 1930, was in every respect a modern ship. In both design and construction she had the benefit of the latest developments in the art of shipbuilding. The President's recent suggestion that in the future passenger vessels should be built of steel—all steel—has been anticipated in the MORRO CASTLE and in all modern passenger vessels. She is what would be called an all-steel vessel.

The double bridge and overhanging promenade deck, the sun deck, the bridge deck, shelter deck, upper deck and lower deck, all are steel. All deckhouses are steel, also the companion hoods and enclosures, skylights, domes, etc. There were no wooden structures on the MORRO CASTLE. Steel could hardly have been used more fully and extensively.

The point then is not steel structures, for these are customary, but rather how these structures are treated after erection to make them, according to the tradition of yesterday and partly of today, warm, livable, comfortable and agreeable in an aesthetic sense. And for these purposes wood in large quantities and other materials of a comparable nature were used throughout the vessel and especially in the passenger accommodations.

Tinder for the Flames

All exposed decks on the MORRO CASTLE were laid with caulked wood, including the wings over the navigating bridge, top of wheel house and officers' houses, engineer's house, wireless house and forecastle deck. In the enclosed promenade, deck ballroom and veranda cafe there were transoms of teak and the bulwarks inside, below the rail, were paneled in teak. Doors to the decks were teak. In the lobbies and in the public rooms many varieties of woods, mahogany, satinwood, ebony, and rosewood in attractive finishes were used.

The bulkheads in the first class lounge were white mahogany. The smoking room was executed in walnut. Light antique oak in old English design was used throughout the public spaces for tourists.

In the deluxe suites on C deck,

THESE BEAUTIFUL WALLS ARE STEEL: Absolutely no lining is used on the walls of this social hall on the American Scantic line vessels SCANPENN, SCANYORK, SCANMAIL *and* SCANSTATES *designed by George G. Sharp, naval architect, New York*

hardwood and painted wood bulkheads were used alternately. Special and regular staterooms were generally alike in character, having painted wood bulkheads and furniture, principally in hard wood.

And so it went, with period furniture, hangings, carpets and all the other appurtenances of the accepted mode in beautiful and comfortable interiors for a first class modern ocean vessel.

In the steel structure which framed all of the elaborate quarters on the MORRO CASTLE, by what stretch of the imagination and to what extent could these more or less inflammable materials, considered necessary for comfort and beauty, be replaced by cold steel?

The art of steelmaking, fabrication and finish has passed through a remarkable development in recent years, and the steelmaker and artisan in steel are now prepared to go a long way to meet the most critical requirements of the artist and the interior decorator.

No criticism can in justice be directed to the builders and designers of magnificent vessels such as the MORRO CASTLE. It is this terrible disaster, the rapidity and the fierceness and extent of the conflagration which will direct intensive effort toward making possible a fire-resistant construction which will, at the same time, meet the requirements of interiors pleasing to the eye and adapted to the comfort and convenience of the passengers.

Engineer Cites Dangers

In his progressive and comprehensive paper on "Fire Control for Passenger Vessels," presented by the New York naval architect, George G. Sharp, before the Society of Naval Architects and Marine Engineers, last November, many matters were discussed that now appear of particular significance in view of the recent disaster. In this discussion Mr. Sharp said in part:

"Notwithstanding the fine records of many long-established steamship lines, one must be careful not to be lulled to inaction by these records, since there is evidence of potential danger.

"On the other hand, being stampeded, by the consequences of conditions which need not exist, to striving for the unattainable goal of 100 per cent protection leads back to discouraged inaction.

"Recent experience seems to indicate inherent weakness somewhere leading to the failure of the apparently adequate statutory detection and extinction systems to provide for control of an incipient fire."

In this paper Mr. Sharp outlined, "the principal factors to be dealt with in the development of a means for controlling fire, particularly in the accommodations of passenger vessels; to outline briefly the means whereby control of fire might be more confidently expected; to compare existing practices to see wherein they fail; and to suggest the additional provisions whereby the desired end may be attained."

We cannot here attempt to cover even briefly the great scope of this paper in which the whole subject of fire control for passenger vessels is dealt with fully and ably. What we are particularly interested in at this time is the emphasis the author directs to the improvement in architectural design looking to the development of simple forms that would lend themselves to the elimination of wood and simplification of construction. He remarks:

What Is Beauty on Ship?

"It is difficult, of course, to conceive of anyone carrying out some of the designs noted in the public rooms of a great many passenger vessels without an extensive and costly use of wood. It is still more difficult to offer any suggestions, if this type of decoration is to be insisted upon, except to have it carried out in fire resisting materials, thereby increasing expense and weight."

He goes on to say, " It is doubtful if a proper appraisal of the passengers' taste in such matters has been made by those responsible," and that "the question of decoration is raised here on account of its particular bearing on the economics of fire control."

Illustrations accompanying this article show parts of the public rooms of vessels dealt with by Mr. Sharp within the last few years. They clearly indicate the pleasing effect that may be obtained at low cost with the use of wood brought down to a minimum and the usual decoration eliminated. They show the possibilities of the use of structural steel with no lining in the walls of passenger quarters.

Mr. Sharp calls attention to the amount of hidden furring, bracing, etc., that has crept into and has been continued in use in the construction of public rooms on board ship thereby increasing the cost and the fire hazard. He recommends that furring behind linings as known at present whether of treated or untreated wood should be eliminated entirely, and suggests, "it is not so difficult to understand how some of the practices developed as it is to account for their determined persistence." In this connection he states:

"All are familiar with the labyrinth of timber behind the side walls of some dining rooms where they have for some reason been framed away from the side of the vessel, also with the construction where frames and bulkhead stiffeners are furred and partially or entirely lined with boards to form backing for some type of composition board of lesser thickness than ordinary bulkhead panels. A simple sill and top runner would have carried panels of appropriate thickness suitably jointed to take any desired face trim, thus obtaining the same results at much less expense and weight.

Economics Are Possible

"In dealing with such conditions in fire resisting construction, metal runners and joints are preferable though treated wood is considered satisfactory. Either method is much less expensive than adhering to the more usual practices."

From all this it is evident that a very definite step in the elimination of wood and other non-fire resisting

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ALSO AN ALL-STEEL ROOM: This hall, designed by Mr. Sharp, shows how steel can be used decoratively for public rooms of ocean liners. This illustration, as also that on the opposite page, is reproduced from the Transactions of the Society of Naval Architects and Marine Engineers for 1933

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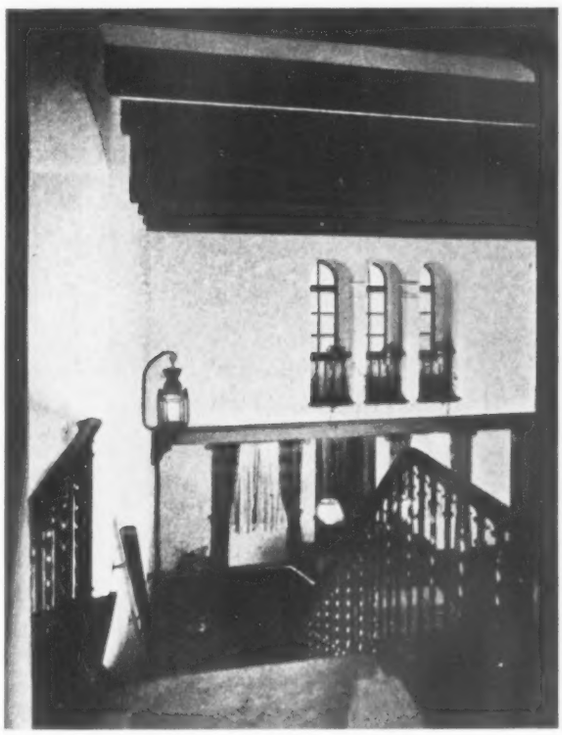


material has already been taken and found satisfactory in the construction of passenger accommodations on board ship.

This is but a beginning. Much remains to be done to solve the difficult problem of the naval architect and the shipbuilder in the use of steel and other metals for the interiors on board ship and thus remove the major part of the substance on which a fire feeds after its inception. It would be difficult to go so far as to suggest that a substitute should be found for the teak or pine decks. This would be the last and the most humiliating departure from tradition.

But who knows, perhaps the future will witness even this drastic transformation. We cannot help joining the universal protest against such a change.

H. G. Smith, president of the National Council of American Shipbuilders, said last week the MORRO CASTLE disaster would undoubtedly create a demand for elimination of combustible materials, and use of metal furniture, partitions and similar products.

Labor

ONLY a few weeks ago southern newspapers were citing the cooperation of the Gulf States Steel Co., Gadsden, Ala., and its labor forces as an ideal partnership of industry and labor. Employes pledged not to agitate; the company to keep operating even if to accumulate stocks.

But Friday, both labor and management were before the bar of the national steel labor relations board, it being alleged by the Amalgamated Association of Iron, Steel and Tin Workers that five men had been dismissed by Gulf States for alleged union activities. Representing Gulf States were L. J. Geohegan and Borden Burr.

¶Not until October, and in Pittsburgh instead of Washington, will the steel labor board take testimony on the petition of the Amalgamated local at the McDonald, O., works of the Carnegie Steel Co. for an election of representatives for collective bargaining. The hearing was scheduled for Wednesday.

REPUBLIC TO FILE BRIEF

Both the Republic Steel Corp. and the local lodge of the Amalgamated at Republic's Warren, O., plant will file briefs with the steel labor board on the protest of the Amalgamated, charging dismissal or layoff of 12 men for alleged union activity.

¶Each of the 15,000 workmen of the Aluminum Co. of America last week received a copy of the agreement which settled the month-long strike two weeks ago. Accompanying the statement was a personal letter from Roy A. Hunt, president, saying he was gratified at the manner in which employes conducted themselves and that there had been no violence. Aluminum Co. handed the union a smashing defeat, its only concession being officially to recognize collective bargaining as required in the recovery act.

Weir Confident Wrong Policies Will Be Rejected

THE indefiniteness of section 7-a of the National Industrial Recovery Act and the different opinions widely expressed about it have raised this present conflict," said Ernest T. Weir, chairman of the National Steel Corp., commenting on present industrial strikes, shortly after his recent return from Bermuda.

"I feel that all these strikes and labor hysterics are creating a lack of confidence. Labor unrest is the immediate trouble, but it may not be the basic cause of these backward conditions. It is in the textile industry now, and who knows but it may be in the steel industry next week. Motor and other industries are all affected by this uncertainty and loss of confidence.

"However, I feel very strongly that, in the long look, we haven't reached the cataclysmic stage, at all. America's line of progress has always been upward, and we have no reason to fear for the permanency of the United States. I am not exercised over current enactments and administration policies because, after all, the American people will sift them down and throw out the policies that are wrong."

New Capacity

REPUBLIC STEEL CORP. is making tentative inquiries for installation of a continuous strip mill at the Corrigan, McKinney Steel Co., in Cleveland, assuming that the consolidation of these two companies and also of Truscon Steel Co. is approved, and a new financial setup is sanctioned by stockholders of Republic at a meeting Oct. 30.

The new Republic mill is expected to be a 54 or 60-inch one. Such a mill could roll 100-inch wide material, though not continuously. At present, demand for material this wide is light, aggregating 5 per cent of the strip demand, but it is expected to increase as automobile body manufacturers specify wider sheets to lessen the number of parts to be welded. One manufacturer is installing presses large enough to fabricate the body for a small car in two pieces.

¶Continental Roll & Steel Foundry Co., East Chicago, Ind., has booked the contract for a 4-high, 38-inch continuous hot strip mill for the Illinois Steel Co. plant at Gary, Ind., to replace the present 28-inch mill. This is believed to be the first rolling mill of size constructed by engineering works in the Chicago district, and is part of the improvement program recently undertaken by the United States Steel Corp.

BOOKS ELECTRIC FURNACES

Pittsburgh Lectromelt Furnace Corp., Pittsburgh, recently was awarded a five to six-ton operating charge size furnace for the Kilby Car & Foundry Co., Anniston, Ala. The latter will be able to pour about 70 tons of ingots every 24 hours in plain carbon billet size. The furnace will be operated basic with graphite electrodes. On production of plain carbon steels, this type of furnace ordinarily turns out 12 to 14 heats of five to six tons each, every 24 hours with a graphite electrode consumption of about five pounds per turn, and an energy consumption of 500 kilowatt-hours per ton.

This furnace is now under construction at the Thirty-second street shops of the Pittsburgh Lectromelt Furnace Corp. at Pittsburgh, as is a larger furnace recently contracted for by the International Nickel Co. for its Huntington, W. Va., division.

Meetings

CODE matters will occupy much of the convention of the National Wholesale Hardware association at Atlantic City, N. J., Oct. 22-25, and also of the National Association of Sheet Metal Distributors, Philadelphia, which will meet with the hardware group Oct. 23 and 24. The differential clause of the wholesale code will be considered especially. A session will be devoted to roofing lines. George A. Fernley, 505 Arch street, Philadelphia, is secretary of both associations.

¶American Institute of Steel Construction Inc. will hold its twelfth annual convention at the Edgewater Beach hotel, Chicago, Oct. 24-26, at which the code will be fully discussed.

DETROIT STEEL CLUB GOLFS

An enthusiastic group of approximately 150 steel executives and Detroit buyers attended the annual outing of the Iron and Steel Club of Detroit, held Sept. 8 at the Indianwood Golf Club, near Pontiac, Mich. The golf tournament in the afternoon was followed by a dinner, after which numerous prizes were distributed.

The first recipient of the president's cup was Arthur Schaeffer, district manager at Detroit for Republic Steel Corp., who had a low net score of 72, while Chris Brinke, Allegheny Steel Co., had the low gross score, 73, for the tournament.

NRA

OFFICIAL announcement is expected to be made this week of a temporary reorganization of NRA, pending the drafting of legislation for a permanent form for introduction at the January session of congress.

Under this temporary setup, NRA will be broken down into three divisions—legislative, administrative and judicial. General Johnson will be chief of the administrative, and Donald R. Richberg probably head of the judicial division. The reorganization plan is believed to be more that of Mr. Richberg than of General Johnson.

While the colorful personality of General Johnson cannot be dimmed speedily, it appears certain that one-man control of NRA has come to an end. The attitude taken recently by General Johnson and his close associates is that industry should regard him as its champion rather than that of labor.

Pending actual consummation of the reorganization, NRA has been at a virtual standstill the last two weeks with officials hesitant to make any but the most urgent decisions.

TAKES CREDIT FOR MUCH

Last week NRA claimed it had made this contribution to recovery: An increase of 2320 in employment over June, 1933, a total of 40,180,000 persons having been employed in June, 1934; total weekly wages in manufacturing industries increased from $96,000,000 in June, 1933, to $132,000,000 in June, 1934; labor's share of national income increased from 58.3 per cent in June, 1933, to 62.5 per cent in June, 1934; increase in the wholesale price index from 60.2 in March, 1933, to 74.6 in June, 1934; index of corporations' profits changed from a deficit of 6.9 in the first quarter of 1933 to a profit of 33.2 in the first quarter of 1934.

¶Rapid progress in organizing state agencies to supervise the co-ordination of apprentice contracts in NRA codes according to the new federal committee on apprentice training is claimed by NRA. State agencies to receive applications for approval of individual apprentice contracts from employers are being set up. The Wisconsin board has already been approved, and nominations for Delaware and Colorado have been received.

CODE AUTHORITIES APPROVED

For steel joist industry: George F. Bateson, Truscon Steel Co., Youngstown, O.; James F. Curley, Concrete Steel Co., New York; A. P. Clark, Kalman Steel Corp., Bethlehem, Pa.; William Sabriskie, Gabriel Steel Co., Detroit; J. H. Verschleiser, Laclede Steel Co., St. Louis; William H. Guest, Ingalls Steel Products Co., Birmingham, Ala.; and P. E. Griffith Bates, Expanded Steel Corp., East Chicago, Ind.

¶For steel wool industry (to handle trade practice complaints): Melville G. Steinhardt, president, American Steel Wool Mfg. Co., New York; George W. Brooks, general manager, Eagle Steel Wool Co., and Arthur J. Roth, president, James H. Rhodes & Co., Chicago; Milton B. Loeb, president, Brillo Mfg. Co., Brooklyn, N. Y.; Henry C. Bosch, vice president, International Steel Wool Co., Springfield, O.; and William H. Robbins, president, the Williams Co., London, O.

¶Cutting Die Industry: John J. Adams, Worcester, Mass.; Wilson Palmer, United Shoe Machinery Corp., Beverly, Mass., and Charles A. Messmer, St. Louis Cutting Die Co., St. Louis.

¶Milk and Ice Cream Can Manufacturing Industry: John M. Breen, sales manager, Buhl Stamping Co. Detroit; R. F. Davis, secretary, Creamery Package Manufacturing Co., Chicago; and R. H. Strickland, general sales manager, Solar-Sturges Mfg. Co., Melrose Park, Ill.

CODES APPROVED:

For refrigeration valves and fittings industry, effective Sept. 16, setting up a code authority of five members, fixing the maximum work-week at 40 hours, with minimum hourly rates of 40 cents for male and 35 cents for female workers in the North and 5 cents less in the South.

¶Budget for the scrap iron and steel trade for the year ending April 1, 1935, has been fixed at $50,140.

Washington

STATE department is working on a foreign trade agreement with Sweden, similar to the reciprocal agreement recently consummated with Cuba and believed to reopen a 100,000-ton steel market to American mills.

American imports from Sweden have been moderately heavy. In 1933, they inclued 2800 tons of steel bars valued at $288,686, 9085 tons of wire rods valued at $604,652, 1000 tons of pipes and tubes valued at $113,115, 1350 tons of flat wire and strip valued at $693,370, and $50,051 worth of tool steel.

¶Customs bureau has announced to its collectors the proper method of ascertaining the length of iron and steel wire staples for the purpose of determining the rates of duty under paragraph 331 of the tariff law.

The bureau informs its collectors that the staple is to be measured from the tip of the points of the staple to the inside surface of the curved end of the staple. The bureau states that this is in conformity with present commercial understanding.

Foreign Trade

SHIPMENTS of iron and steel products to non-contiguous territories in the first seven months of 1934 totaled 62,059 gross tons, a gain of 12,559 tons over the corresponding period of last year, and 12,381 tons over the total for all 1932, according to the iron and steel division of the

FIRST VOTER AT LABOR BOARD'S FIRST ELECTION: Rex Davis, tableman, drops the first vote into the ballot box at the election held Sept. 6 at the West Virginia Rail Co., Huntington, W. Va., under auspices of the national steel labor relations board. The Amalgamated Association of Iron, Steel and Tin Workers won over the employes' association 234 to 137. Elections have been held previously to elect representatives of employes, but this was the first under the new labor board. Acme photo

bureau of foreign and domestic commerce.

Hawaii led by taking 33,482 tons, with Puerto Rico 17,167 tons, and Alaska 11,410 tons. Hawaii in the first seven months took 18,781 tons of tin plate. Puerto Rico's heaviest purchases were of cast iron pipe and fittings, 6419 tons. Alaska's chief demand was for tin plate, 6736 tons.

Institute

THERE was an air of expectancy in New York last week that a showdown on the future of the steel code was at hand. For one thing, it was believed that at his conference with President Roosevelt at Hyde Park last Tuesday, Myron C. Taylor, chairman of the United States Steel Corp., had presented the industry's viewpoint.

The report has been current for many weeks in Washington that price provisions would be eliminated from all codes, and possible unfair practices in some, leaving only the labor provisions. No official statement has ever been made anticipating such a situation, but it is believed that the steel industry would throw up its code in this event.

¶Opposition is developing to new quantity extras on plates and shapes, made effective Oct. 1. An eastern locomotive interest, for example, contends that its specifications must be for small lots because of the varying requirements for repairs to different types of locomotives. An eastern shipbuilder also is agitated, alleging that it also cannot order other than in small lots.

Structural Code

J. L. KIMBROUGH, president of the Indiana Bridge Co., Muncie, Ind., last Thursday and Friday conferred in Washington with members of the NRA industrial advisory board on the structural steel code which has been held in abeyance since July 22, owing to opposition of structural steel fabricators to control over the erection of steel being lodged in the construction code.

No official action is expected to be taken on the code until the return of General Johnson, who continues to work for a compromise. The creation of a code authority by NRA for the solid fuel industry after the original code body resigned, may set a precedent for treatment of the structural code in event General Johnson elects to stand with his labor advisory board and over-ride the industrial advisory board. A code for the architectural, ornamental and miscellaneous iron and bronze, wire and metal specialties industry was recently put into effect with changes from the code as originally accepted by the industry.

Production

FOLLOWING the seasonal trend, steel production lifted 2½ points last week to 20½ per cent, regaining the loss in the first two weeks of September. Any deviation from this level will probably be on the up side rather than the down. Four important districts advanced their steel production rate last week. In the Detroit, Wheeling, New England and Buffalo districts there were no changes, while at Birmingham and Cleveland declines of 2 and 6 points respectively were noted. Details follow:

Pittsburgh—Increase 5 points to 13 per cent last week, this gain being based on an improvement by the leading interest, as well as a sharp improvement by one of the smaller independents, who by the end of last week was operating at almost 30 per cent.

Fourteen of the district's 60 steel works blast furnaces are operating here this week, with the following individual rates maintained unchanged: Carnegie Steel Co., 7 of 32; Jones & Laughlin Steel Corp., 2 of 11; Bethlehem Steel Co., 2 of 7; Pittsburgh Crucible Steel Co., 1 of 2; National Tube Co., 1 of 4; and American Steel & Wire Co., 1 of 2.

Detroit — Holding at 77 per cent through last week, 13 out of 17 open-hearth furnaces were operated by two district producers.

Wheeling—Unchanged at approximately 23 per cent last week, with 9 out of 39 open-hearth furnaces in the district active. One district producer has four furnaces on and the other, five.

Central eastern seaboard—Up fractionally to about 16 per cent, with little variation expected this week. Raw material production is still in excess of finished steel output at most plants.

New England — Unchanged last week at 25 per cent, with an additional open hearth scheduled to resume operations starting this week, bringing the rate to slightly above 30 per cent.

Buffalo—Unchanged at 19 per cent last week, with 7 out of 38 open hearths operating. No definite improvement is in sight to lift production out of the rut into which it has fallen.

Birmingham — Down 2 points to 23 per cent last week. Four of the larger open-hearth furnaces of the Tennessee Coal, Iron & Railroad Co. at Fairfield continue in operation. No change is indicated for this week.

Chicago—Rose about a point to 24 per cent, only slightly above the year's low of the preceding week. Little further improvement is in early sight. Eight steelworks blast furnaces and two merchant stacks continue active.

Cleveland-Lorain—Off 6 points last week to 18 per cent. A 2 or 3 point gain in steelworks operations is expected this week. Corrigan, McKinney Steel Co., whose plant was idle last week, contemplates relighting three open hearths and starting its bar mill. Offsetting this will be a reduction from five to four active open hearths by the National Tube Co., Lorain. Otis Steel Co. continues with two units.

Youngstown—Gained 1 point last week to 24 per cent and probably will hold at this rate this week, with a narrow gain likely soon.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1934	1933	1932	1931
Jan.	231,777	285,138	426,271	800,031
Feb.	385,500	275,929	413,001	762,522
March	588,209	256,793	388,579	907,251
April	643,009	335,321	395,091	878,558
May	745,063	455,302	338,202	764,178
June	985,337	603,937	324,746	653,104
July	369,938	701,322	272,448	593,900
Aug.	378,023	668,155	291,688	573,372
8 Mo.	4,426,856	3,581,897	2,850,026	5,932,916
Sept.	.....	575,161	316,019	486,928
Oct.	.....	572,897	310,007	476,032
Nov.	.....	430,358	275,594	435,697
Dec.	.....	600,639	227,576	351,211
Yrl. adj	.....	44,283	5,160	6,010
Total	.....	5,805,235	3,974,062	7,676,744

¶Shipments of finished steel products by the United States Steel Corp. in August were 378,023 tons, a gain of 8085 tons over July, when shipments were 369,938 tons. For eight months of 1934 shipments totaled 4,426,856 tons, a gain of 844,959 tons over the 3,581,897 tons shipped in the comparable period in 1933.

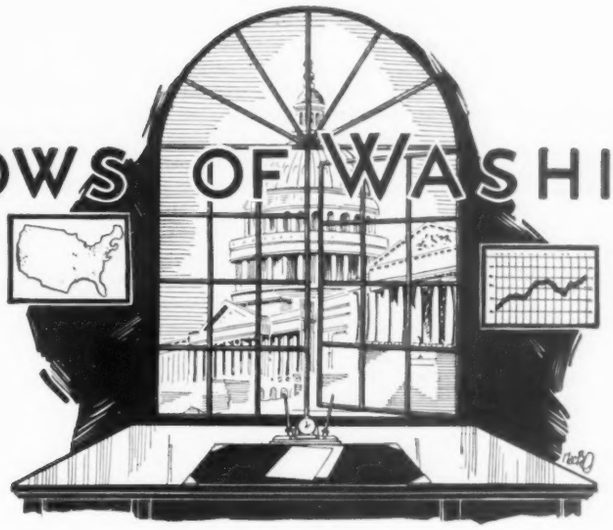
Financial

REPUBLIC STEEL CORP. has announced its consolidated statement as of June 30 showing total assets of $270,816,764, against $268,275,152 on Dec. 31, 1933, and profit and loss deficit of $1,191,350 against profit and loss deficit of $2,013,920 at the close of 1933.

Current assets amounted to $47,768,823 and current liabilities were $14,346,761, against $41,437,340 and $12,371,958 respectively on Dec. 31, 1933. Cash on June 30 last totaled $6,259,041, while on Dec. 31, 1933, cash and certificates of deposit amounted to $5,709,008.

¶The board of governors of the New York stock exchange has authorized the listing of Republic Steel Corp. deposit receipts, representing the preferred shares of the company, as deposited under the plan of consolidation outlined in the letter mailed to stockholders under date of Aug. 27.

WINDOWS OF WASHINGTON



WASHINGTON

INDUSTRY is incorrigibly optimistic despite all the harsh treatment it has received from the new deal. It tries to read a measure of assurance into every governmental development and scarcely a week passes that it does not detect a major turn to the right.

At the moment, industry is construing the reorganization of NRA, accompanied by the subordination of General Johnson who now fancies himself the champion of industry; the various statements of Secretary of the Treasury Morgenthau on fiscal policy, and the dispatch of Head Braintruster Tugwell to Europe, as support for its hopes for conservatism.

But the fact is, not by one word or act has the President ever deviated from the main purposes of the social reform which is the objective of the new deal. True, he has done a little trimming at times, but only in the nature of a football quarterback trying to pick a bigger hole in the opponents' line, to use the President's favorite simile. Whatever setbacks have occurred in business he has appraised as wilfull obstruction or inevitable adjustments not likely to prove fatal.

MAINE KEEPS IN STEP

Always a whispering gallery, Washington has overflowed with speculation concerning future policy since the Maine election which, it is conceded, was won by the Democrats on points. If the President is as astute as he is given credit for, he does not see any danger signals flying or any immediate menace to his program.

Washington is by no means comprised entirely of new dealers; there is a generous sprinkling of representatives of business, including steel, who have seen administrations come and go. This group is now almost 100 per cent anti-new deal, for the minority which was inclined to defer judgment and give the administration a chance now sees that any softening toward business is not in the cards.

This group is coming to believe that it can see what is ahead of business over the next year. This speculation, of course, cannot be authenticated, for the reason administration strategy is not shouted from the housetops, but it has the earmarks of reasonableness. This speculation runs as follows:

> The Maine election shows that the new deal, enormous expenditures for relief and work-making projects and other government policies are sufficiently popular to insure the election of a favorable congress in November, without any appreciable concessions to conservatism.

SURE OF IMPROVEMENT

Notwithstanding the pressure for reform, business will continue to improve, slowly but steadily — as the opposition would say, in spite of what is being done in Washington. Backed up demands are already beginning to spill over the dam.

As the American Federation of Labor has pointed out, there is a shortage of 5,000,000 homes and in the past year only 50,000 were built; likewise there is a shortage of 11,000,000 automobiles, and current production is at the annual rate of only 2,650,000.

This repressed demand will develop in increasing measure over the next six to eight months and in itself prove sufficient to lift business. The coming winter will be a difficult one, but will be mitigated by the natural development of shortages in all lines, including those sustaining the durable goods industries.

Sometime in 1935, probably in the last half year, the time will be propitious and enough reform will have been accomplished to satisfy the new deal, to gradually lift restrictions on business and inaugurate a wave of prosperity that will not fall far short of 1929. These good times will carry over into 1936, the next presidential election year, and set the stage properly for the administration.

After 1936 will come the aftermath—especially of the cost of the new deal. If the administration is re-elected it will have three years more to worry out of the situation; if a Republican is elected president, the problem will be on his doorstep and he will start out under a handicap.

It will be interesting to watch over the next few months for developments in support of this theory. Already congressional leaders are saying that the necessity for greater taxation will not become acute at the coming session of congress. PWA loans to governmental bodies lesser than the federal government do not fall due until four years from the date of their making, which will be 1937 and 1938. Plans for legislation reshaping NRA and putting into effect such reforms as unemployment insurance and old age pensions are being expedited in order to insure early action at the session of congress convening in January, thereby clearing the decks as early in the year as possible.

Under this theory some degree of upturn this fall is regarded as certain, and a substantial degree in the spring inevitable. Then, look out for the last half of 1935 and the first half of 1936 for the release of pent-up demand!

LABOR'S FINGER IN PIE

ORGANIZED labor in general remains faithful to the advice of its late leader—Samuel Gompers—that it not enter the ranks of political parties, but the strategy behind its present unparalleled militancy reduces its aloofness to a distinction without a difference.

Next month the American Federation of Labor's annual convention gets under way, and all through October, or during the crucial last weeks of the congressional campaign, the convention will be a sounding board for what the new deal does or

fails to do for labor, and what the opposition develops.

Accordingly, labor is putting the screws on Washington, and in many directions not much pressure is needed. Genuinely convinced that NRA has disappointed it and that the administration dare not refuse any salient concession with the election coming on, labor is aggressive to a point never before attained.

The textile strike, in effect a thrust at NRA, scales a new height in the insistence that the entire industry be closed before arbitration or mediation is attempted. It is as though the Amalgamated Association of Iron, Steel and Tin Workers, prior to any election of representatives for collective bargaining and any test of its power other than intimidation, require the steel industry to close every mill before negotiating.

WOULD ENFORCE PRODUCTION!

Witnessing employment ebbing as industry and capital retreat before the new deal, the federation last week called upon the government to map out a program of controlled production. In other words, on terms that labor and the government prescribe, industry should be made to operate and produce a stated volume of its output regardless of the effect on its financial structure.

Demands for elections for purposes of collective bargaining are appearing in increasing numbers. In iron and steel, these are popping up chiefly at small plants, where considerable organization work has been done. The issue is not wages or hours, but recognition. With one exception, the large iron and steel producers have been passed by for the moment.

The pressure against General Johnson at NRA, which is manifest through Secretary of Labor Perkins, is part of the campaign. The groundwork is being laid for 30-hour week legislation at the next session of congress. Both the national and the steel labor relations board have succumbed without any show of resistance of labor's program of majority representation of labor instead of the proportional method desired by industry and prescribed by the President himself for the automobile industry.

Industry will be under fire until election day, with no defenders at Washington.

THE steel labor board penned an epitaph last week when it ruled that "the Amalgamated Association of Iron, Steel and Tin Workers is hereby certified, and it is accordingly to be accepted, as the representative of employes at the West Virginia Rail Co. for the purpose of collective bargaining, with all the rights and privileges vouchsafed by law to such choice and certification."

That epitaph marks the grave of the Huntington Steel Works' association, which lost to the Amalgamated by a vote of 237 to 134 in the election held Sept. 6. In fact, with variations it will be erected over the remains of minority groups in every iron and steel plant in the country.

In taking this stand for majority representation the steel board is patterning after the national board, coming to be known as the Garrison board. First in the Guide Lamp and Tubize-Chatillon cases, and more recently in the Houde Engineering Corp. case at Buffalo, the Garrison board erased the rights of minorities in a complete surrender to labor. What policy the board would have adopted in event company unions had won the first test cases will never be known.

In any event, the issue between industry and labor on the now-famous section 7a of the recovery act is clearly defined, and unquestionably will go as high as the Supreme Court. In the few cases to come before it affecting the new deal, the high court has divided, and sustained the new departures by a narrow margin.

Having formally refused to bow to the Garrison board's edict, the Houde corporation is being cited for removal of its blue eagle. It is generally understood that the automobile industry is regarding Houde as a test case, with steel scarcely less as an interested onlooker. If the legal authorities of the steel industry deem the Houde case to cover all the ground, steel may regard it as a test case.

Houde has received in the past few days the same antagonistic newspaper interpretation of its situation that the Republic Steel Corp. did a few weeks ago in its case affecting the Amalgamated. Houde's refusal to accept the adverse ruling is heralded as a defi to Washington.

AIM TO DESTROY PEACE

Labor favors the majority rule because it puts a premium on agitation and organization. It creates a contest between an employer and an outside union to see which can sign up a majority of employes first. A satisfactory status quo is certain to be upset. In the senate and house, where section 7a was drafted and approved, the minority party is represented on every committee according to the proportional method in most instances.

Few comments on the new deal have been so critical as those of the National Association of Manufacturers on the Houde decision. Advising employers to ignore the ruling until "competent judicial authority" has passed on it, the association says:

"We recommend that employers continue to abide by the longstanding and authoritative interpretations upholding the right of minority groups to deal with their employers previously made by the President, Administrator Johnson and General Counsel Richberg until competent judicial authority has declared otherwise. In view of the policies and decisions of the national labor relations board and regional labor boards throughout the country we urge upon manufacturers the utmost caution in seeking or submitting to the jurisdiction of such boards.

"The decision raises issues of perhaps greater importance to employes than to management, because it deprives them of the elementary right to dispose of their own labor on their own terms through representatives of their own choosing. It compels groups of employes to be represented by those whom they have not chosen.

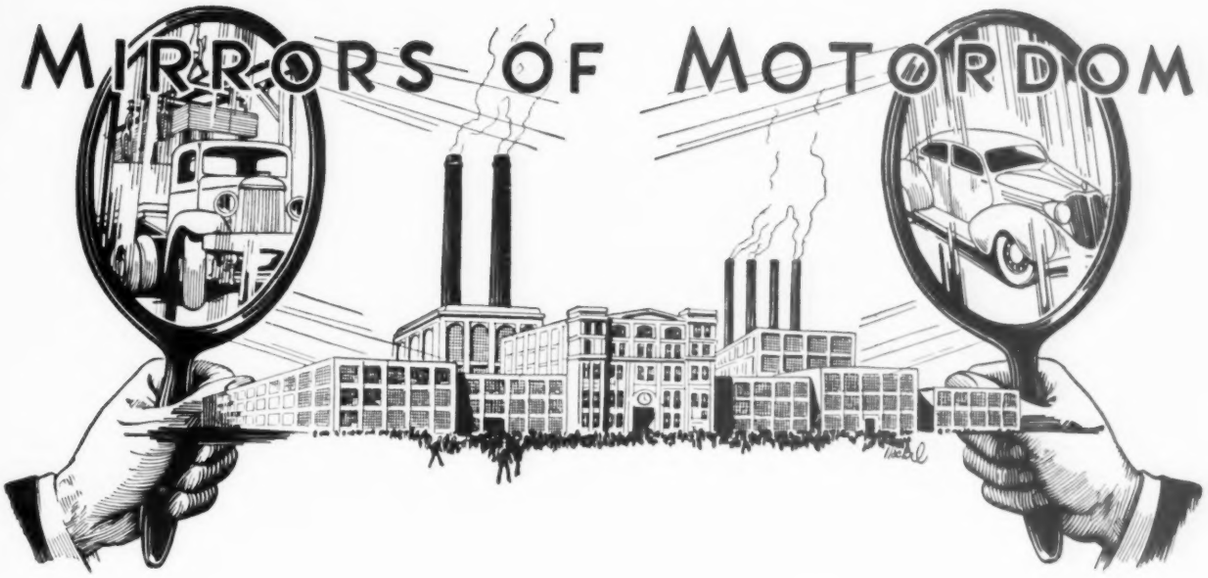
"The decision is not supported by the alleged precedents cited by the labor board. It flatly contradicts the interpretation of section 7a of the recovery act made by the President in settling the automobile strike, and also the continuing interpretations by Administrator Johnson and General Counsel Richberg, upon all of which employers and employes relied and under which they have established relations with each other."

A unique election in which the sporting instinct developed was conducted at the plant of a large steel consumer in Cleveland last week. Rivalry between an American Federation of Labor and an IWW local resulted in a bargain that an election be held and the loser automatically become members of the winning union. The IWW element won by a small majority, so all employes of that plant now are IWW's.

NRA CALM BEFORE STORM

WASHINGTON still can see nothing but an overshadowing of General Johnson in the proposed temporary setup of NRA, involving the creation of a judicial, a legislative, and an administrative branch, each to be independent. General Johnson, as head of the administrative division, would be the least powerful, without discounting his personality too much. . . Meanwhile, NRA has settled down to almost complete stagnation. Only the most necessary actions have been taken. Even a decision on the structural steel code does not rate important enough to break the stalemate. With a few exceptions, only political appointees are now occupying the strategic positions in NRA. . . There are mixed feelings about the President's refusal to loan Russia $200,000,000, as part of the debt settlement. In one sector, this move is regarded as a conservative gesture and makes the President seem a little less radical in refusing to advance the soviets money. On the other hand, American manufacturers of durable goods stand to lose much at just the time Russia is entering the League of Nations. . . It has been proposed to Secretary of Commerce Roper that American railroads sell their surplus rolling stock to China.

MIRRORS OF MOTORDOM



DETROIT

SEPTEMBER appears to be repeating the showing of preceding months in that at the opening the automobile industry expected a sharp decline in retail sales, only to have the middle of the month indicate a comparatively brisk market, and the final showing for the month loom up seasonally good.

The experience of Ford is typical. In August its world sales were 88,800 units, 40 per cent more than in August, 1933, and greater even than July, reversing the usual seasonal trend. Actual sales of passenger cars in the United States exceeded 72,000.

Last week Ford assembled 16,690 units, compared with 13,540 the week before. August actual production has totaled 65,000 units, 7000 fewer than sales. September production also is calculated to be a little under actual sales, the objective being to reduce inventories of used cars as the time for model changes approaches.

Last week Ford rehired over 300 draftsmen, and Briggs, which is a large maker of Ford bodies, is rushing plant alterations and extensions to be completed Oct. 1. A start will be made shortly on two-door sedan bodies for 1935 models.

SEASONAL STRENGTH SHOWN

It was expected that Chevrolet passenger car sales in August would exceed those of Ford, but on the claim of 72,000 by Ford, Chevrolet was topped by about 10,000. Chevrolet's August production at 85,000, however, was 20,000 greater than that of Ford. Last week Chevrolet assembled 11,800 units, or 200 fewer than in the week preceding. The September schedule of Chevrolet is 58,000 units. More emphasis will be placed on the standard series and on commercial cars over the remainder of the year.

Retail sales of Plymouth also are seasonally strong, indications being that September sales will slightly exceed 30,000 units, compared with 35,000 in August and 39,000 in July. Plymouth production last week totaled 6175, compared wth 4600 the week preceding.

Another Chrysler unit—Dodge—also increased last week, the total being 1700, or a gain of 300 units. Passenger car sales are running about 1800 units weekly and September output will approximate 5500, or about 3000 fewer than in August.

Buick almost doubled its schedule last week when it increased from 525 units to 900. This is in accordance with the September schedule of 4300 units, compared with 5700 in August, and indications are that the last half of the month will show a further improvement.

Terraplane-Hudson also participated in the the upward swing, assembling 750 units in a three-day week. Dealer stocks are receding fast, at the rate of 500 a week. August sales of Terraplane-Hudson models are reported as approximately 5500 units, or only 700 fewer than in July. Hudson is reported to have completed the design of a new type of radiator.

Pontiac last week went against the trend when it curtailed from 1300 a week to 650. Its schedule for September is about one-half the 5500 assembled in September. Retail sales, however, exceed current production by a wide margin and dealer stocks are being shortened.

Nash was unchanged at 400 units last week, about 60 per cent Lafayette and 40 per cent Nash. Some improvement the remainder of the month is necessary if 2000 units are to be made this month.

Willys-Overland, which has been operating on irregular schedules approved by the federal court, is petitioning to make 10,000 more. Studebaker, Pierce-Arrow and Lincoln were closed last week. Lincoln, incidentally, sold more cars in the last ten days of August than in any ten day period since April, 1932.

Hupp was unchanged last week at about 225 units, Graham about 100, Auburn 250, Chrysler 225, Packard 200 and Reo 150.

SUMMARY OF PRODUCTION

For the week, total production was 43,560 units, compared with 38,166 the week before and 32,586 in the week ended Sept. 1, according to *Cram's Reports*.

Assuming that the last two weeks of the month equal the week ended Sept. 15, September production will be about 167,000 units, compared with an estimate of 235,000 in August. If this estimate for August is accurate, it will have exceeded August, 1933, by the narrow margin of 3000 units. September at 167,000 units would be about 15,000 below September, 1933, but double September, 1932.

Despite this tapering off the come-

(*Please turn to Page* 69)

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1932	1933	1934
January	119,344	130,087	156,907
February	117,418	106,888	231,707
March	118,959	118,002	331,263
April	148,326	180,713	354,745
May	184,295	218,347	331,641
June	183,106	253,387	308,051
July	109,143	229,357	266,575
August	90,325	232,855	235,000*

*Estimated.

Estimated by *Cram's Reports*

Week Ended	
Sept. 1	32,506
Sept. 8	38,166
Sept. 15	43,560

Here and There In Industry

MIDWEST STAMPING & ENAMELING CO., Morrison, Ill., recently incorporated, has bought the plant at Morrison formerly occupied by the steel box divison of the Illinois Refrigerator Co., and will utilize it for the production of stampings and porcelain enamel sheet steel parts. The company has been organized by S. S. Battles, chief engineer of the Ingersoll Steel & Disc Co., subsidiary of the Borg-Warner Corp., Chicago, who is president. George Green, for many years engaged in the porcelain enamel field, is superintendent and C. E. Bullock will be sales manager, with offices in Chicago. The plant has 65,000 square feet of floor space, equipped for the manufacture of steel refrigerator cabinets and forming, stamping, lacquering, painting and porcelain enameling.

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Bailey Meter Co. Ltd., Montreal, Que., subsidiary of Bailey Meter Co., Cleveland, has received an order for 21 recording and integrating steam flow meters and auxiliary pressure recorders for installation at the Sarnia, Ont., plant of Imperial Oil Refineries Ltd., Toronto, Ont.

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Latrobe Electric Steel Co., 40 West Fortieth street, New York, has opened a tool steel warehouse at 380 East Main street, Stratford, Conn., where complete stocks of standard sizs will be carried. George H. Grundy and Charles A. Lampard will be in charge of sales.

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Chain Belt Co., Milwaukee, has appointed Rapp & Hollins Inc., 7001 North Clark street, Chicago, its exclusive agent in northern Indiana, northern Illinois, eastern Iowa and southern Wisconsin for its sand handling equipment, mold and casting conveyors and other foundry equipment.

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Chalmers Oil Burner Co., Minneapolis, has made a large shipment of oil burners to Casablanca, French Morocco, and another to Ceuta, Africa. The company now has nearly 100 oil burners in operation in Paris, about 50 in Holland and 25 in Madrid, Spain.

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Arup Mfg. Co., South Bend, Ind., manufacturer of new type flying-wing aircraft, has moved its operations to 1428 East Nineteenth street, Indianapolis. C. H. Ruggles, plant engineer for the Bell Telephone Co., and Robert L. Brown, both of Indianapolis, have been elected directors. Ralph R. Graichen, chief engineer, has been made a director and vice president. C. L. Snyder is president. Other directors are Dr. F. J. Vurpillat, R. A. Goheen, H. A. McCullough, R. L. Stewart and Hiram Snyder.

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Link-Belt Co., shovel and crane division, Chicago, has appointed Allegheny Equipment Corp., 1218 Grant building, Pittsburgh, with warehouse at Bradford, Pa., an authorized distributor for its crawler shovels, cranes and draglines and locomotive cranes. T. F. Ruane will be in charge of the Link-Belt account.

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Sier-Bath Co., 640 West Fifty-eighth street, New York, manufacturer of precision gears for 25 years, has been given a contract by the S-B Gear Corp., New York, to manufacture the latter's complete line of gear reducers. This is a new line soon to be placed on the market. It is designed on a new line and differs essentially from other reducers.

Died:

EDWARD A. LANGENBACH, 69, chairman of the former United Alloy Steel Corp., Canton, O., now a unit of Republic Steel Corp., and long identified with the sheet, tin plate and alloy steel industries of northern Ohio, at his Congress Lake home near Canton, Sept. 8.

Born in Canton, as a young man Mr. Langenbach operated a tin smithing shop, branching out into the making of roofing spouts by hand machines. In 1887 he, with John J. Berger and Herman Klorer, formed the Berger Mfg. Co., with Mr. Langenbach as president. In 1900 he was named secretary of the newly-formed Carnahan Tin Plate & Sheet Co. About the same time the Stark Rolling Mill Co. was formed with the same officers as the Carnahan company. The Stark company was absorbed by the Berger company in 1906 following incorporation of the latter.

The United Steel Co. was formed in Canton in 1903 with Mr. Langenbach as manager. The new company steadily expanded and in 1916 became the United Alloy Steel Corp. of New York, absorbing the United company, the United Furnace Co., the alloy division, the Berger company, and the South Steel division formerly known as the Canton Sheet Steel Co. United Alloy later merged with Central Steel Co. and Central Furnace Co., of Massillon, O., into the Central Alloy Steel Corp., the latter in turn acquired by Republic.

Meanwhile Mr. Langenbach had retired, but retained his interests in the Ohio Ferro Alloys Corp., with works at Philo, O.; also the Carbocite Co., the Hercules Motor Co. and the McCaskey Register Co. of Alliance, O. He built the Courtland hotel in Canton, where he made his permanent home.

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F. P. Kern, president of the Southern Iron & Equipment Co., Atlanta, Ga., at his home there, Sept. 3.

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Frank B. Reed, 81, founder of the Clearfield Machine Co., Clearfield, Pa., in that city after an illness of two years.

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Howard S. Garten, 35, superintendent of the pyrometer laboratory of the Studebaker Corp., South Bend, Ind., at his home there recently.

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Gomert Powell, 72, for many years master mechanic of the Michigan City, Ind., plant of Pullman Car & Mfg. Corp., in a Chicago hospital recently.

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James Moore, since 1930 president of Richard Dudgeon Inc., New York, manufacturer of hydraulic machinery, at his home in Brooklyn, N. Y., Aug. 24.

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Harry Palley, 72, founder and president of the Palley Mfg. Co., Pittsburgh, which he established in 1905 to manufacture pressed metal cabinets, in Pittsburgh, Sept. 11.

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William F. Babcock, 67, since 1930 president of the Felt & Tarrant Mfg. Co., Chicago, manufacturer of office calculating equipment, at his home in Chicago Sept. 7.

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Algernon S. Uhler, 60, mining engineer and vice president of the Ingersoll-Rand Co., New York, at his home in Westport, Conn., Sept. 5, after an illness of six months. He had been with the company for over 35 years, for seven years being in charge of the South African office at Johannesburg.

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Joseph B. Smith, for the past 26 years plant engineer of the Malleable Iron Fittings Co., Branford, Conn., in that city, Aug. 21, after an illness of several weeks. His professional career began with the Thompson-Houston Co., Lynn, Mass., and later he was connected with the River Point division of the Providence Railway system and the Central Power Co., Mystic, Conn.

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Carl E. Loyster, 50, for 25 years designing engineer for the Globe Steel Tubes Co., Milwaukee, in that city, Aug. 17, after a short illness. He was born in Hudson, Mich., graduated from the University of Michigan and became associated with the Alamo Gas Engine Co. from 1902 to 1903. In 1905 he was designer of ventilating equipment for the McCreery Engineering Co., Toledo, O., and in 1910 was named mechanical engineer for the Globe company. He was a member of the Engineers' society of Milwaukee.

Industrial Men in the Day's News

R. D. BLAKESLEE, a graduate of Penn State college and in the employ of the Sharon Steel Hoop Co. since he left the army in 1919, became district sales manager at Cleveland, Sept. 6, succeeding E. R. Garlick, who has resigned. For the past 13 years Mr. Blakeslee has been assistant sales manager at Cleveland.

J. K. Owen succeeds Mr. Blakeslee as assistant district manager.

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James D. Sisler will become consulting geologist for the United States Steel Corp., effective Oct. 1, according to reports from Morgantown, W. Va., where he recently resigned as state geologist.

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Dr. R. Leonard Hasche, for the past three years director of chemical research for the A. O. Smith Corp., Milwaukee, has been appointed director of research and development for the Tennessee Eastman Corp., Kingsport, Tenn., subisidiary of the Eastman Kodak Co., Rochester, N. Y. Prior to his association with the Smith company, Dr. Hasche was superintendent of research for the American Smelting & Refining Co., New York. While in Milwaukee, he developed a new process for the production of dry ice, patents on which are held by the Carbonic Development Corp., of which he is president.

James H. Lansing

Who as announced in STEEL for July 30 has been named general manager of the Grand Rapids Malleable Works of the Chicago Railway Equipment Co., Grand Rapids, Mich.

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J. N. Crombie, assistant manager of the Shenango works of American Sheet & Tin Plate Co., New Castle, Pa., has been transferred to a similar position with the Elwood, Ind., works of the company, succeeding Lee Landon who as noted in STEEL for Aug. 13 recently was transferred to Gary, Ind.

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Lindsay M. Donaldson has resigned as general manager of the Massey-Harris Co., Racine, Wis., and Batavia, N. Y., builder of farm machinery and tractors, effective Sept. 15.

D. C. Selheimer, who joined the Racine plant's engineering department in 1929 and since 1932 has been general factory manager, succeeds Mr. Donaldson.

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R. X. Raymond, associated with the Chain Belt Co., Milwaukee, for over 14 years, has been appointed manager of the Minneapolis district for the company, succeeding G. A. Gunther who is being transferred to the Detroit territory as district manager. Mr. Raymond has been associated with the Chicago office of the company, previous to which he was active in both engineering and manufacturing departments of the Milwaukee plant.

□ □ □

H. W. Rinearson, until recently vice president of the A. M. Byers Co., Pittsburgh, has been elected president of the Shaw-Perkins Mfg. Co., Pittsburgh. Prior to his association with the Byers company, he was at one time affiliated with the American Rolling Mill Co.

Walter H. Burr, New President, Association of Iron and Steel Electrical Engineers

For the past 17 years he has taken a leading part in affairs of this technical organization.

Since 1917 he has directed work in electrical and mechanical departments of two steel companies.

Previously he occupied a number of engineering posts with a prominent electrical manufacturer.

WALTER H. BURR, for the past thirteen years connected with Lukens Steel Co., Coatesville, Pa., has been elected president of the Association of Iron and Steel Electrical Engineers for the year 1934-35. The association is holding its annual convention and exhibition in Cleveland this week.

Graduated from Rose Polytechnic institute, Terre Haute, Ind. in electrical engineering in 1905, Mr. Burr entered the employ of the Westinghouse Electric & Mfg. Co. as an apprentice at the East Pittsburgh, Pa., works.

In 1906 he was transferred to the service department of the Philadelphia office, where he remained 11 years, during which time he acted as test engineer, construction engineer, assistant district engineer and was engaged on construction work in connection with a number of water and steam-driven power plants and the electrification of many steel mills and railroads in the East.

He left Westinghouse and became associated with the Alan Wood Steel Co., Conshohocken, Pa., as assistant electrical engineer in 1917, and remained in this capacity four years.

In 1921 he went to Coatesville as superintendent of the electrical department of Lukens, and in 1932 was made superintendent of electrical and mechanical departments.

He has been a member of the Association of Iron and Steel Electrical Engineers for 17 years, having served as chairman of the Philadelphia section twice. He has been national chairman of the developments committee for the past seven years and has taken active part in affairs of the association.

EDITORIAL

Has Auto Industry Found Pattern for Recovery?

THE longer sound substantial business improvement is denied the nation, the more it will be apparent that genuine recovery cannot be won by monetary miracles, legislative legerdemain or political poker playing. In the end we will find that the new deal philosophy of negation and destruction is wrong. It will be demonstrated, as proved time and time again in the past, that the positive qualities of constructive policies and productive activity will win success.

Fortunately this view is gaining wider acceptance throughout the country. Among industrial executives a marked trend toward renewed efforts to fight the depression independently of futile government action is discernible. More and more responsible leaders are beginning to realize that industry itself possesses powerful resources, which if guided properly, may hasten recovery in spite of the retarding influence of federal bureaucracy.

One of the most important of these resources is the ability of American industry to organize efficiently for mass production. Here, to an extent not even remotely approached in any other industrial nation, we have acquired the knack of co-ordinating the functions of research, design, engineering, manufacture, finance, sales and distribution so effectively that intricate mechanical appliances can be turned out at amazingly low prices.

Industry's Talent for Harnessing Resources For Mass Production Is Big Asset

The traditional example of this is furnished by the low-priced automobile. It is difficult to envision any article of commerce available anywhere in the world which affords the purchaser more real value for the money than does an American motor car in the low-price range. The appeal of this extraordinary value is so strong that one can witness numerous instances in any city or hamlet where persons with insufficient means for adequate food, clothing and shelter will skimp themselves on these essentials in order to acquire a motor car. This explains in part why there are 25,000,000 automobiles in service in the United States as compared to only 20,000,000 telephones.

Consider how the development of the modern automobile has affected wealth, income, production of materials, manufacture of machinery and tools, employment, etc. Certainly it was the strongest factor in economic and industrial development in the United States during the first third of the present century.

The experience during this period brought forth a pattern for industrial organization which differs radically from anything which preceded it. It is a pattern which already has been adopted in large measure in the development of other industries. It furnished guidance for the radio industry a few years ago. It provided the plan which enabled the infant electric refrigerator industry to grow so rapidly that today, after only a few years of activity, there are approximately 5,900,000 units in service in American homes. The same pattern is serving in the development of air conditioning equipment, airplanes, household electrical appliances, and numerous other products.

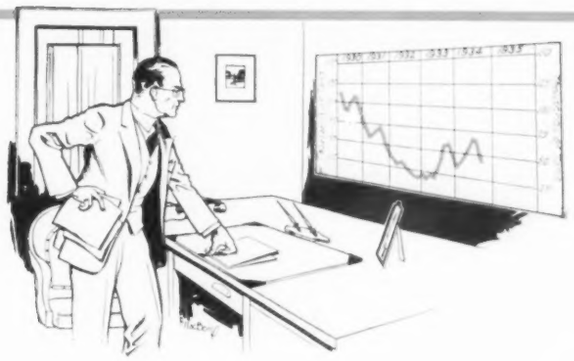
Smaller Profit on Greater Volume Is Guiding Principle in New Attack on Depression

If we read the signs correctly, an extremely significant change is taking place in the philosophy of those who direct the destinies of the industries engaged in the manufacture of these articles. The executives of these companies apparently were impressed by the success which attended the decision of automobile builders to slash prices. Recently electric refrigerators, kitchen ranges, oil burners, air conditioning units and other products appealing to mass consumption have been introduced at unbelievably low prices. Apparently the manufacturers are counting on volume, just as the automobile builders did.

It is too early to judge the results. However, under fair conditions, the chances for success are good. In view of what the automobile people have accomplished, there is no reason why the number of refrigerators, modern ranges, air conditioning units and similar products should not mount to from 15,000,000 to 20,000,000 in a few years.

Anyone who cares to engage in arithmetical calculation will discover readily that the attainment of even a fractional part of this objective will furnish a mighty incentive for national recovery.

THE BUSINESS TREND



Manufacturers Now Fare Better Than Producers

ONE reason why opinions as to the present state of business vary so widely is that conditions in certain closely allied industrial groups have been reversed during the past year.

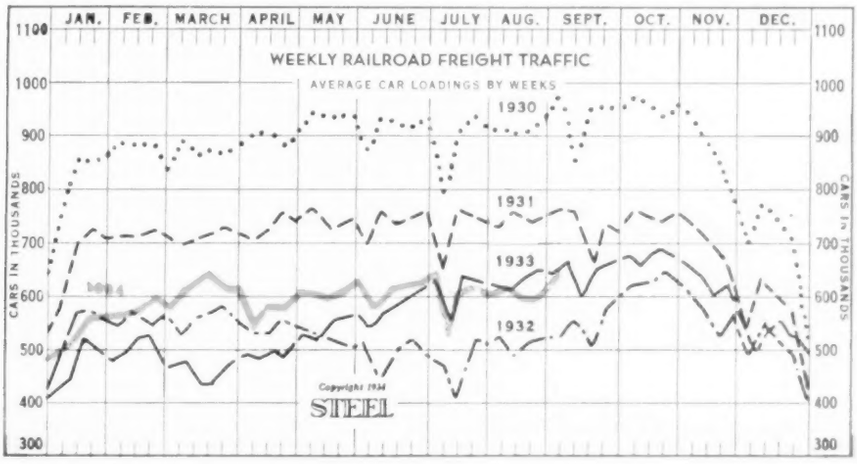
In the rapid rise from April to July in 1933, the iron and steel producing industry enjoyed a far greater degree of improvement than did the heavy equipment, machine tool, foundry equipment and similar groups. In fact, throughout all of 1933 producers of materials generally fared better than manufacturers of equipment. It was this disparity which brought the durable goods industry into the limelight so prominently early in 1934.

Today the situation is reversed. Steel operations are sluggish at the low level of around 20 per cent of capacity, while many branches of the equipment industry are fairly active. Whereas most producers of materials are worse off than they were a year ago, many manufacturers of engineering equipment, such as cranes, buckets, rolling mills and accessories, etc., and builders of machine tools and foundry equipment now are faring better than they were 12 months ago.

Is Fair Business Volume Distributed Among More Companies Than It Was Last Year?

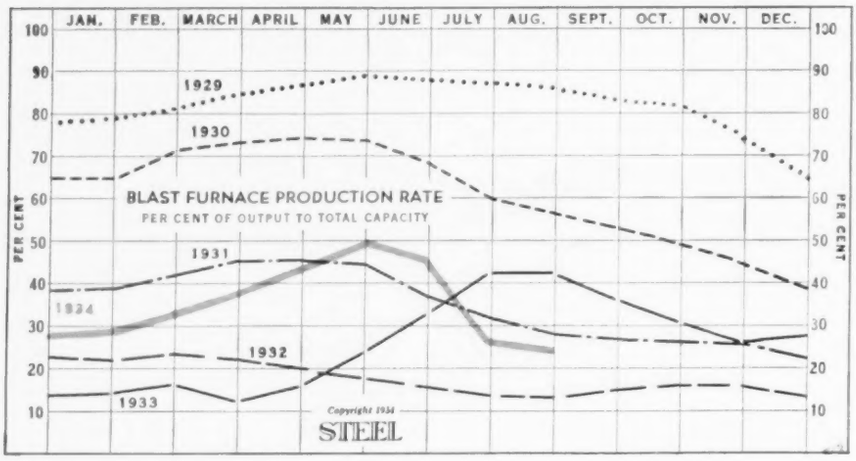
In view of this change, it is quite possible that fair business conditions are distributed among a larger number of companies of moderate size than was the case last year. However, total volume for all industry unquestionably is lower. This is indicated by the index of industrial production which was 76 in July and 73 in August compared with 99 and 91 in the corresponding months last year.

A second reason for conflicting views as to business conditions is found in the widespread use of outdated statistics. Many of the sanguine statements put out currently by Washington bureaucrats are based on the figures for June, or for the first half. Naturally the conditions thus pictured do not jibe with the actualities of today.



1934	
Sept. 1..	645,780
Aug. 25	605,516
Aug. 18	600,564
Aug. 11	602,530
Aug. 4 ..	611,298

1933	
Sept. 2 ..	666,652
Aug. 26	637,510
Aug. 19	643,406
Aug. 12	629,743
Aug. 5 ..	635,655



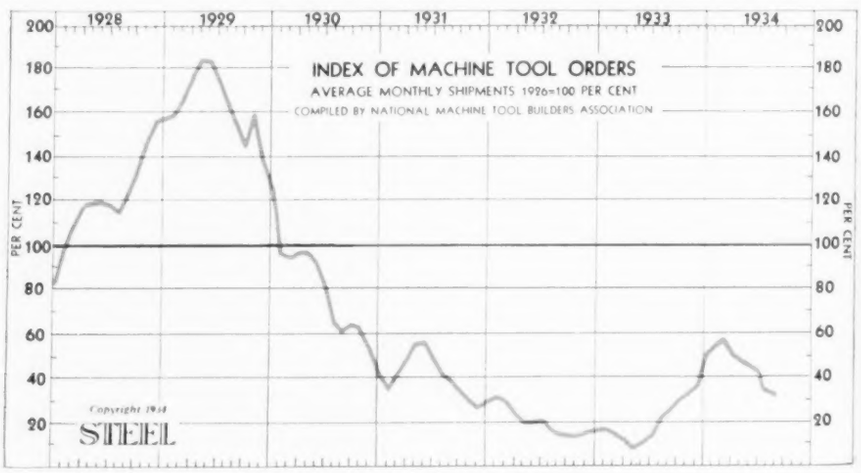
	Per Cent
August, 1934	24.5
July, 1934	28.4
August, 1933	42.8

61 Furnaces Active on Last Day of August

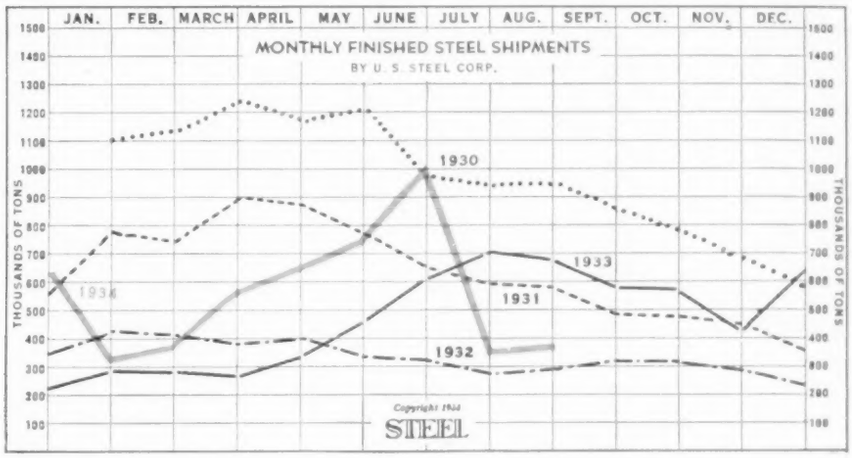
With iron output in August registering a loss of 168,357 tons, 13 more blast furnaces were removed from operation, making a total loss of 56 furnaces going out of blast since June 1. Stacks in blast on Aug. 30 totaled 61. Relating production to capacity, the operating rate for August was 24.5 per cent, compared with 28.4 per cent in July, 46.3 per cent in June and 47.5 per cent for May, the latter being the high point for the year. The current operations were the smallest since May, 1933, with 20.9 per cent. In August, one year ago, the rate was 42.8 per cent. In August, 1933, 98 furnaces were producing iron while the highest point of the current year was 117 on May 31.

Machine Tool Index Turns Upward in August

The index of machine tool orders, based on the volume of shipments for 1926, advanced from 34.7 in July to 41.4 in August. According to the latest report from the National Machine Tool Builders' association, there is a better volume in both domestic and foreign business and also the distribution of orders through the industry is much improved. Out of 203 companies, 53 per cent reported better business for August than for July. The three-month average for August was 37.1, down slightly from 38.6 in July and compares with 27.9 in August, 1933. Orders for foreign shipment advanced from 8.4 in July to 9.0 in August while domestic orders advanced 6 points to 32.4.



	Per Cent
August, 1934	37.1
July, 1934	38.6
August, 1933	27.9



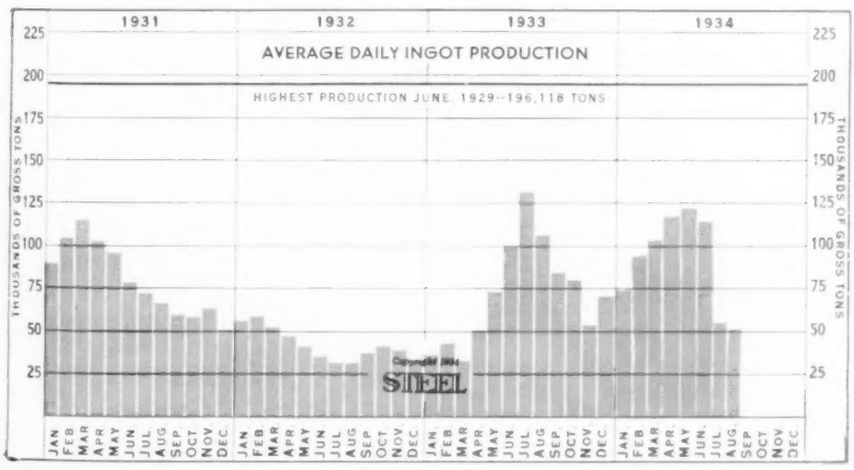
	Tons
August, 1934	378,023
July, 1934	369,938
August, 1933	668,155

August Steel Shipments Advance Moderately

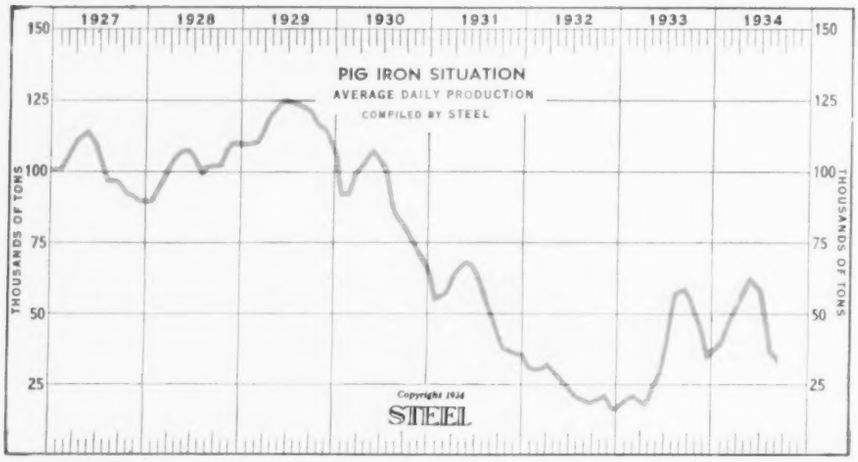
Shipments of finished steel products by the United States Steel Corp. during August increased 8085 tons to a total of 378,023 tons, according to the monthly report of the Corporation. The August movement rather exceeded previous expectations as it was generally believed a small loss in tonnage would be reported for the month. Shipments in July totaled 369,938 tons and in August, 1933 amounted to 668,155 tons, in 1932, were 291,566 tons, and in August 1931, were 573,372 tons. For eight months' period ending August 31, shipments totaled 4,426,856 tons, compared with 3,581,897 in the corresponding months of 1933 and 2,850,026 in the same period of 1932.

Ingot Production Lowest Since March, 1933

The daily output of steel ingots declined in August to the lowest level since March, 1933, according to the report issued by the American Iron and Steel institute. The average daily output in August was 50,495 gross tons, which was 22.93 per cent of capacity, compared with 58,903 tons or 26.75 per cent of capacity, in July. The high point of the year was 124,174 tons daily in May. In spite of the sharp shrinkage since May (the peak month this year) the record of eight months of 1934 is well above that of the corresponding period of 1933. Average daily output during the eight months of 1934 was 91,427 compared with 72,011 in the corresponding period of 1933.



	Tons
August, 1934	50,495
July, 1934	58,903
August, 1933	106,058



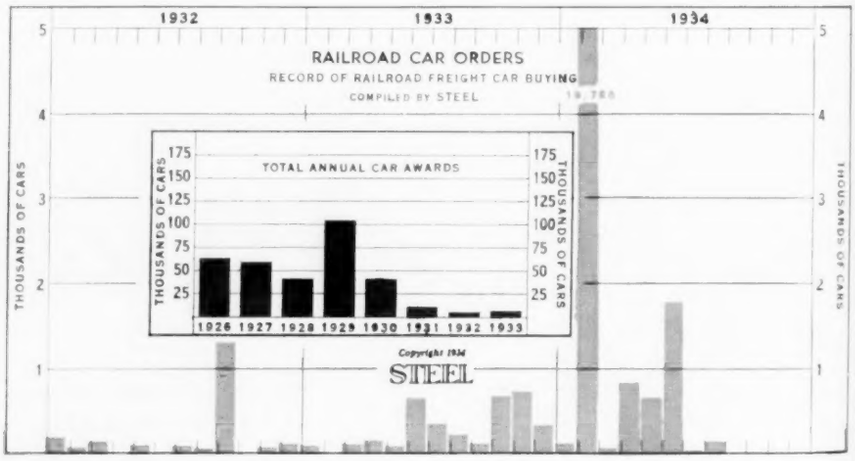
	Tons
August, 1934	34,199
July, 1934	39,630
August, 1933	59,137

August Iron Output Continues Downward

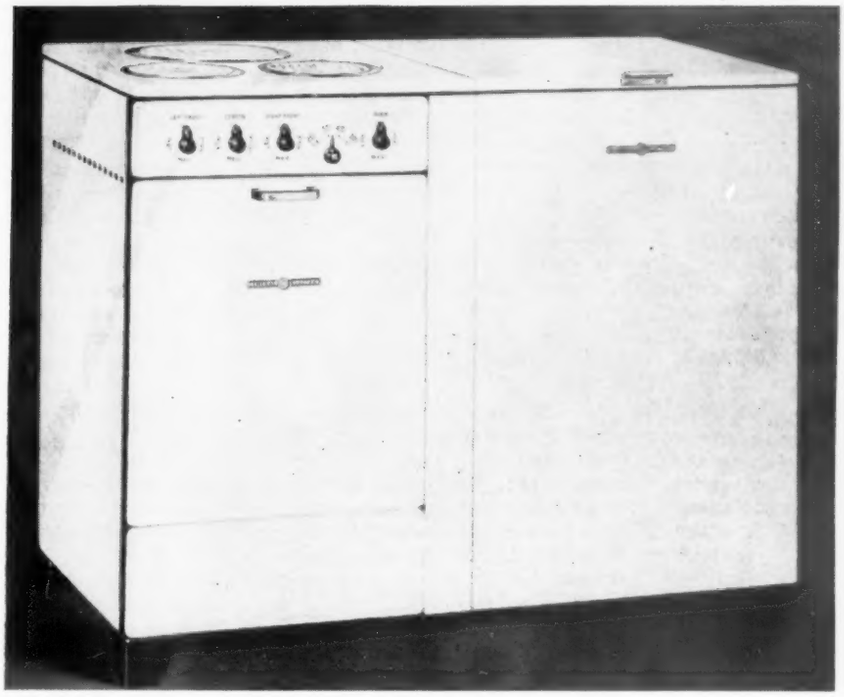
Continuing the downward swing of the past two months, the average daily output of coke pig iron in the United States during August fell to the lowest level in 15 months or since May, 1933. The average daily rate in August was 34,199 gross tons, a loss of 5431 tons, or 13.7 per cent, from the 39,630 tons of July. The daily production in August, 1933, was 59,137 tons. August was the third consecutive month to show a loss, the July rate having dropped from 64,563 tons in June, and the June output from 66,370 tons in May. The latter was the highest daily rate in 1934.

Freight Car Awards Show Slight Improvement

Although August did register a slight increase in domestic freight car awards the number still is far below the point where an improved outlook can be sighted. August awards totaled 105 cars compared with only 19 in the preceding month and 202 in August, 1933. In August, 1932, only 5 cars were ordered while in 1931 awards amounted to 1304 cars. However, total awards for the first eight months at 23,383 cars, show a sharp increase over the corresponding period last year when only 1074 awards were placed and in 1932, during the first eight months, awards dropped to 389 cars.



August, 1934	105
July, 1934	19
August, 1933	202



Recently General Electric introduced this new type of electric refrigerator and electric kitchen range, priced at $77.50 and $72, respectively, or in combination at $142.50, factory. Modern household equipment at prevailing low prices presents a strong bid for mass consumption. What will this mean to industry?

At the bottom of this page a modern dishwasher sink, recently brought out by Westinghouse, is illustrated. It is one of many new aids to housekeeping now offered to the public at progressively lower prices. Will the experience with these appliances match the early rise of the automobile?

What Mass Acceptance of Household Appliances Will Mean To Industry

WILL the experience which attended the spectacular rise of the automobile in the first third of the present century be repeated during the next few years in the growth and development of the manufacturing refrigerators, stoves, air conditioning apparatus and other similar articles which are adapted to mass consumption and mass production?

If history does repeat itself in this manner, how will producers and fabricators of materials, parts makers, machinery and equipment builders and other units of the great American industrial machine be affected? These questions are of prime importance, not only because they have a bearing upon the immediate problem of national industrial recovery, but also because they are tied in closely with the general trend of development throughout the second third of the present century. These questions have both short and long term significance.

In answering the first question, one can find important evidence in the experience of the past five years of depression. During that period the ability of the automobile industry at times to increase the volume of sales in the face of receding business in many other lines of activity was demonstrated convincingly.

The principal reason for the partial immunity from the more drastic effects of hard times was the motor car industry's success in organizing to afford the public great car value at low prices. Much credit for this is given to the efficiency of mass production. But this is only part of the explanation. The fact is that the automobile industry—at least during the de-

pression—reversed the ancient order of industrial thinking.

Instead of starting with production facilities, and working from there toward the consuming market, the automobile builders in the past few years have started with the consumer and worked back to production. They have asked, "what is required to sell cars against the resistance of the present market?" At one time they thought the answer lay in drastic revisions in design. On another, more recent occasion, they decided the answer lay in producing a good car at a price so low the public could not withstand the temptation to buy.

Met with Success

At any rate, this approach to the problem has been successful under extremely unfavorable circumstances. The appeal of low-priced, modern automobiles is so strong that hundreds of persons who really are not financially able to own cars are denying themselves something of the essentials of food, shelter and clothing in order to enjoy this cheap transportation.

However, the automobile is not the only product which has demonstrated partial immunity from depression conditions. During the past few years electric refrigerators have made great strides forward. Air conditioning apparatus, heating furnaces, kitchen ranges, dish washers, oil burners, and numerous similar household appliances have gained ground in spite of the unfavorable conditions.

None of these products is strictly new, most of them having been in the experimental stage a number of years. Nevertheless, the transition from the experimental to the commercial stage in most cases has occurred recently or is still in process.

The history of electric refrigerators will illustrate the point. Mechanical refrigeration is quite old, but most of the important development in adapting the process to residences has been encompassed in the past decade. By 1932, the number of electrical refrigerators installed in homes had reached the total of 3,750,000. By Jan. 1, 1934, the number had leaped to about 5,000,000 units. It is estimated that on July 1, 1934, about 5,900,000 refrigerators were in service.

During the first six months of 1934 a total of 1,003,574 units were sold, comparing with 1,065,105 in the entire 12 months of 1933. While sales in July and August were disappointing, in comparison with the sales of the first half, this record since 1932 is truly remarkable.

Throughout most of this period, these record sales were made in spite of discouraging conditions in the consuming market and of a relatively high selling price. This was true in a large measure of most of the other household mechanical appliances. In most cases, the prices of these products were such that the market was restricted to homes whose owners were in the higher income brackets.

Company Polices Change

Since early in 1934, there has been a noticeable change in the policies of companies manufacturing these articles. By mid-summer many manufacturers were openly following the large volume-low profit idea which has proved effective for the automobile builders. In other words, makers of stoves, refrigerators, etc., sized up the market, decided upon the design of product and the price which best suited the prevailing market conditions, and then—as in the case of the automobile builders—they worked back to production facilities.

A new Westinghouse range, welded like an all-steel automobile body, and strong enough to support seven men, yet selling for $61.25—about half the usual price of several months ago

The cabinet shown below is a Thor electric servant, product of the Hurley Machine Co. It is a washing machine, but it has other functions. the top is suitable for a mixing surface, the plug in the right rear corner conceals a shaft on which a clothes winger, ironer or a food mixer can be mounted. There is an outlet for the attachment of other appliances. In a similar model, a radio becomes an integral part of the machine

This consumer-minded policy is responsible for much of the low-priced but high-valued household equipment offered today. The illustrations accompanying this article show a few typical appliances—extremely modern in appearance, highly developed as to mechanical perfection, and yet priced at figures which in some cases are half of the prices asked only a few months ago.

Of course, the success of the present bid for mass consumption depends upon at least a reasonable volume of widely diffused purchasing power. Yet the experience of the depression shows that if the price appeal is strong enough, it will carry a product roughshod over many obstacles—even valid ones.

Assuming that success is bound to come, sooner or later, what will it mean to the metalworking industries?

We know how the development of the automobile has changed these industries, but even here we know only a part of the story. We know the story up to date, but is it not possible that the motor car industry even at this late day may induce many more drastic changes?

The man who posed the figures in this picture intended to emphasize the work-saving features of this Kelvinator boiler-burner unit. However, to the metalworking industry, the significant point is the steady growth of this type of appliances in American homes

Changes Revolutionize Industry

Consider the import of the comparatively recent developments in strip and sheet steel. The continuous mills, which certainly have revolutionized many operations in the steel industry, are purely an outgrowth of changing requirements in the design and construction of automobiles.

Similarly the advances in motor cars affected the operations of every branch of the foundry industry, of forge shops, metal-stamping plants, and thousands of parts-making establishments.

What the development of the automobile has done to change the functioning of the metalworking industry during the past few decades probably will be multiplied many fold by the development of household appliances in the next few years.

For instance, many of the articles for household use are beginning their career at a higher state of development than was true of the early automobiles. The multiplicity of materials now available, the greater use of heat treating, the advance in methods of joining materials—notably in welding, the greater efficiency of machines, the improvements in the science of handling materials—all these and many other factors give to the new household products advantages not enjoyed by articles which were developed earlier.

Perhaps the most drastic changes imposed upon the metalworking industries will be those which arise from price. If manufacturers persist in designing to meet the conditions of the market—and this unquestionably is the policy to be expected under present conditions—then it is likely that pressure will be brought to bear upon parts makers, vendors of materials, etc. to supply their goods at prices which correspond to the conditions imposed by the market.

This will be a bitter pill to swallow for many producers of material, who have always placed the emphasis on the cost of production. In this case it is not of question of whether or not the system is right. Under present conditions, it is the system which its advocates believe will break the back of the depression.

Naturally this system will serve as a powerful incentive for low cost production. Certainly no producer of material or supplier of parts whose costs are out of line on the high side can thrive long in an industrial set-up in which thinking originates with the consumer's problem and works back to production.

Therefore we may expect that changes somewhat similar to that which involved the continuous mills will be more common in the future than in the past. Such changes, as always, will necessitate many realignments and adjustments.

We may witness a repetition of the trend of several decades ago when automobile plants established forge shops of their own because the automobile executives believed the existing forge shops could not handle the big burden suddenly thrown upon them when the motor emerged from a custom-built to a mass production unit.

Manufacturers of refrigerators, air conditioning apparatus, ranges, stoves, etc.—in the struggle to manufacture to a price—may decide that a different material, a cheaper material, an improved finish, on other change is demanded. If the desired material or process were not commercially available, the manufacturer might conceivably undertake to make it himself.

How About Integration?

Just how far this problem, which is the well known question of integration, will enter into the picture in the future, is uncertain. Judging from past experience, the consensus of opinion seems to be against integration. Many manufacturers who built their own foundries, forge shops or stamping shops in the expansion periods of the first third of the century lived to regret their acts. Hundreds of manufacturing establishments today are maintaining idle forge shops, foundries, etc. while buying their forgings and castings in the open market.

The point is that the executive of every company in the metalworking industry which is in a position to participate in the supply of materials, parts or equipment for these rapidly growing household appliance industries is confronted with a new challenge. It is a challenge which can

(Please turn to Page 50)

Science of Seeing Builds New Values For Light In Industry

BY A. H. ALLEN
Associate Editor, STEEL

TWENTY-FIVE per cent of the energy expended by a person on an average task such as might be encountered in industrial operations is estimated to be chargeable to the energy of seeing. Eighty-five per cent of the impressions received by a human being are registered through the eyes. Thirteen per cent of the pathway to good seeing in industry has been covered, lighting specialists state. Relating these three percentages gives an indication of the need for good lighting in industry as an aid to efficient and comfortable seeing.

Recent articles in this series (STEEL, Aug. 13 and Aug. 20) have covered problems of applying lighting to specific inspection purposes and the design of an adequate general lighting system. In this concluding installment an effort will be made to show how engineers have gone a step further and evolved what they term a "science of seeing" or in other words a partnership of lighting and vision. The work is by no means complete but at least the subject, at best of complex nature, is being unraveled and practicalized.

Dr. Matthew Luckiesh, director of the Lighting Research Laboratory of the General Electric Co., Nela Park, Cleveland, may be called the father of this new science of seeing. With his associate, Frank K. Moss, he has built the foundation for an improved concept of lighting as it relates to seeing.[1] What follows will summarize some of their observations.

In the partnership of vision and lighting, the optometrist can get the eye in condition to do its best work; the other partner is at present in the hands of the lighting specialist. The most obvious factor in lighting is quantity or foot-candles. But the foot-candle is only a measure of intensity of illumination and not a measure of seeing. As an influence upon seeing its value is fixed; for, other conditions remaining the same, the effectiveness of a foot-candle, as a direct aid to seeing, diminishes as the level of illumination increases. To double ability to see, it is necessary to increase the level of illumination many times if other factors are not altered. The effectiveness of an additional foot-candle depends upon at least three primary factors. The visual difficulty of the work which the eyes must perform; the manner in which the additional light is used; and the level of illumination to which it is added. But it is also possible to alter quality, direction, diffusion and distribution of light with a resulting increase in the ability to see in many cases.

Table I shows how increasing the foot-candles of illumination for two groups of workers increased their working speed and also reveals how increased light helped a slower group to a greater extent than a faster group. In other words, light as a tool for seeing helps those most who need it most.

Eyes Are Inferior Gages

However, it has been shown that the human being is a poor seeing-meter. The eyes not only have the difficult task of attempting to appraise quantitatively the improvement in seeing, but the individual cannot determine quantitatively the benefit derived in the conservation of his eyesight and energy. The latter has not been performed even in the laboratory with any appreciable degree of certainty. Unfortunately there is no such device as a seeing-meter of universal application. If such an instrument were available, the task of raising the present low levels of illumination to values that are visually desirable would be simplified.

In the light of present knowledge of the science of seeing, it does not seem likely that a seeing-meter—integrating such factors as quality, quantity and distribution of light, glare, contrast, accuracy, speed and comfort—will be available. It is possible to devise certain measuring sticks which will yield measurements on particular phases of seeing and which can be made simple enough to be of service in demonstrating the

[1] *Seeing and Human Welfare*, by Dr. M. Luckiesh; Williams & Wilkins, 1934. *Seeing—A Partnership of Lighting and Vision*, by Dr. M. Luckiesh and Frank K. Moss; Williams & Wilkins, 1931.

Table I

Effect of Increased Light on Working Speeds

Foot-candles increased From	To	Increase in speed of working, per cent Slower group*	Faster group*
3	12	40.4	27.6
6	12	20.3	14.9
12	48	12.0	10.5
24	48	6.3	5.5

*These two groups of workers differ 38 per cent in their natural working rate at the lower level of illumination—at the higher level the difference is 25 per cent.

partial value of better lighting. What the new science of seeing is concerned with eventually is the best combination of conditions which enables seeing most easily, most accurately, most safely, most quickly and most comfortably. It is concerned with the greatest productiveness and with complete conservation of vision and of other human resources which are drained through the process of seeing.

Fig. 1 represents an attempt to construct a simple diagram to illustrate the limitations in measuring the clearness of seeing and also some general results. The test object may be assumed to be used under a wide range of levels of illumination from zero foot-candles on the left to a high level on the right. Assuming that this test object is of a certain size and contrast, it cannot be seen until it and its background are illuminated to a certain level. Then a region of border-line seeing is entered, which is a wide strip and not a narrow border-line as boundaries usually are.

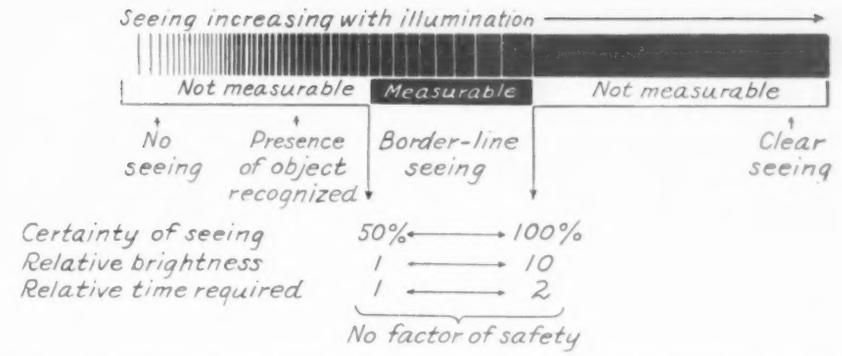


Fig. 1—Measurements on seeing can be made only at the visual threshold or the border-line between seeing and not seeing

Only Measurable Portion

What shall be taken as a measure of seeing? Certainly not the conditions under which it can be seen only one-half the total times it is presented or looked at. Shall it be the point of 100 per cent certainty? If so, it takes ten times the illumination or twice the time for 100 per cent certainty of seeing as for 50 per cent certainty. This region of border-line seeing is the only measurable region. Obviously, no measurements of seeing can be obtained when one cannot see the object. Likewise, after the lighting conditions have reached the point where one can see the object every time it is presented to the eyes, no measurements of this kind can be made.

However, one cannot say that seeing does not become easier if the illumination is increased still further. Measurements of eye-fatigue, ease of seeing, output of visual effort and the like, which have generally defied investigation as yet are sorely needed in order to reveal the relation of lighting to the conservation of eyesight and human energy. Some data already point in this direction.

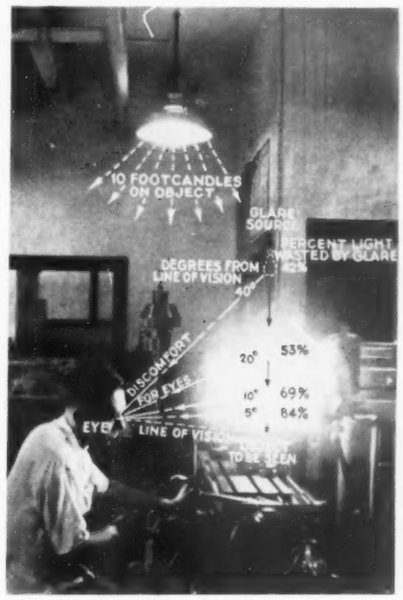


Fig. 2—Showing the cost of glare as measured by the waste of foot-candles required to overcome the reduced visibility due to glare, an undesirable and unusually unnecessary by-product of lighting

In investigational work, 50 per cent certainty of seeing is assumed to be the border-line of seeing.

Ability to see an object depends upon at least four primary variables: Size, contrast, brightness and time of exposure. Size is measured in visual angle—minutes subtended by the object at the eye. Contrast is defined as the ratio of the brightness-difference between the object and its background to the brightness of its background, and for simplicity as expressed as per cent contrast. A perfectly black object on a perfectly white background has a contrast of 100 per cent. Brightness usually means the brightness of the background because the object to be seen is usually small and actually the background is a part of the thing seen. It may be interesting to note the relation of the time required to see an object and of the certainty of seeing. From one investigation involving 60,000 observations the results obtained were approximately as follows:

Per cent certainty of seeing	100	80	50
Relative time required to see object	100	63	48

Characteristics of the Task

In analyzing any visual task consideration must be given to the characteristics of the light, lighting, visual object and of vision. The only physical characteristic of light is its spectral character. Color is a psychophysiological characteristic sometimes important in a way differing from that of spectral character. The characteristics of the visual object are always size, contrast, brightness and sometimes exposure time, color and spectral reflection or transmission.

Fundamental characteristics of vision are retinal sensibility to size, brightness, brightness-difference and time. Some of these characteristics are influenced by light or lighting and some are born of these. The actual size of an object is fixed but its apparent size depends upon such factors as shadow, highlight, background and brightness. Some of the characteristics of the eyes—the visual tool—are fixed but some are influenced by lighting. Among the

Table II

Relation of Lighting and Seeing

(Determined under ideal laboratory conditions)

	Relative improvement in seeing				
Foot-candles	Speed of vision	Speed of reading	Visual acuity	Accuracy of vision	Average results
1	46	68	72	93	70
5	100	100	100	100	100
10	125	108	108	103	111
15	145	111	110	104	118
20	153	113	112	105	121
30	153	114	113	107	122
40	153	114	114	108	122

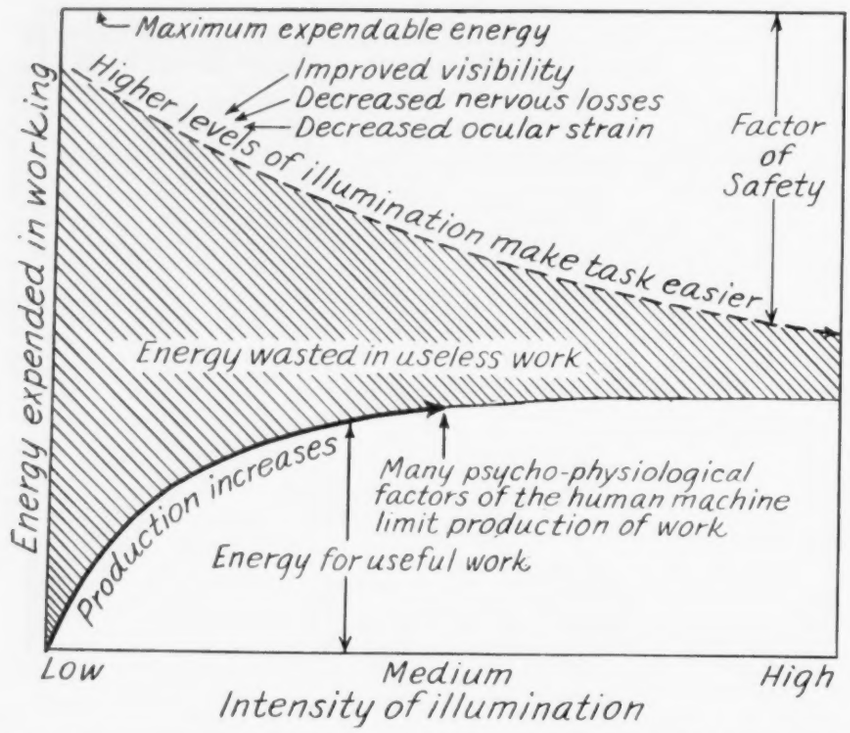


Fig. 3—Interpretation of a vital phase of the science of seeing. The human machine is considered as producing useless as well as useful work. As the level of illumination is increased, useful work increases and useless work decreases. It is believed that after the useful work has reached its maximum, there are further benefits from still higher levels of illumination

latter are pupil size which varies with the lighting, brightness level and brightness distribution. Pupil size in turn influences definition, resolving power, adaptation and brightness of retinal image.

Glare Exacts Heavy Toll

Deleterious effects of glare are well recognized by lighting specialists and investigations have provided fundamental data on these effects. Fig. 2 indicates the loss of visibility in terms of wasted light as the glare source is moved closer to the line of vision. All conditions remaining constant excepting the angular position of the glare source, the decrease in visibility is equivalent to a decrease in the level of illumination of the test object. Assuming the intensity of illumination to be 100 per cent when the glare source was absent, the effective intensity of illumination decreases to 58 per cent when the glare source is 40 degrees above the horizontal line of vision. The effective foot-candles continue to decrease as this angle decreases. In other words, the wasted light, when the glare source is at an angle of 40 degrees, is 42 per cent. This wasted light increased to 84 per cent when the glare source is at an angle of 5 degrees with the line of vision.

Viewed in this manner, glare is indeed costly; but it has been shown that there are other unmeasured losses. Certainly it is discomforting and fatiguing. Possibly it contributes toward some permanent injury of the eyes.

Table II is a summary of some of the investigations made by Nela Park engineers in addition to the systematic studies of seeing. All these were conducted with black test objects on a white background. In fact, all conditions for seeing were ideal. One who narrowly interprets such data would conclude that no additional benefit accrues from increases in intensity of illumination above 20 or 30-foot-candles. In fact, such conclusions are prevalent. But if one considers that most visual tasks do not have these maximal contrasts, that most backgrounds or surfaces have reflection-factors considerably below that of white, that experimental conditions are usually free from distractions common to work conditions, and that such measurements as presented in this table do not include measurements of eye strain, eye fatigue, wasted energy and general wear and tear, one begins to see that much higher levels of illumination are necessary for the best work conditions.

Furthermore, one begins to suspect that by the act of coming indoors and building an artificial world of his own, man cannot necessarily escape the indelible stamp of ages of outdoor lighting environment. Perhaps his eyes and his being need the intensities of illumination equivalent to those thousands of foot-candles outdoors under which they evolved.

Certainly the prevalence of defective vision in industry would point to these suppositions. Studies made by Dr. J. E. Ives of the federal department of public health show that 44 per cent of all industrial workers have defective vision, with 19 per cent corrected and 25 per cent uncorrected. Studies of defective vision related to ages show: Under 20 years, 23 per cent defective; 30 years, 39 per cent; 40 years, 48 per cent; 50 years, 71 per cent; 60 years, 82 per cent; and over 60 years, 95 per cent. This is a serious if not appalling condition. Much is unknown regarding the harmful effects of inadequate and improper lighting upon human eyes and other human machinery. However, from present knowledge it appears that the new indoor civilization needs badly a new science of seeing upon which a new art of lighting for seeing can be developed.

Wrestling with the Unknown

The foregoing paragraphs are only a few glimpses of a complex science in the making—beacons in what was a wilderness a decade ago. Looking ahead, engineers have attempted to include with definite knowledge what they believe is at least an approximation of the unknown with which they have had a vague experience but pertaining to which they have practically no measurements. This attempt is shown graphically in Fig. 3, the lower part of which is founded upon a great deal of knowledge, the upper part of which is no more than a diagrammatic view of what may be approximately true.

As the intensity of illumination increased the curve representing production through visual work flattens out. Beyond this point there is little or no increase in productive work with increase in foot-candles. However, if the human being is considered as a machine, the output of which is expended both in useful and in useless work, another idea of lighting for seeing is gained. The human being in normal work does not expend the maximum amount of energy he is capable of; when he has no light he can expend this maximum energy without productivity if seeing is involved in the task. As the level of illumination is increased useful work increases and it is believed that useless work decreases.

When the level of illumination reaches the point where increase in useful work is prevented by certain limitations of the human machine, the useless work also has diminished considerably. However, it is believed that there are further benefits from still higher levels of illumination; the task becomes easier and easier and useless work continues to diminish. This is the humanitarian aspect of improving illumination. It may not be reflected in productive economies

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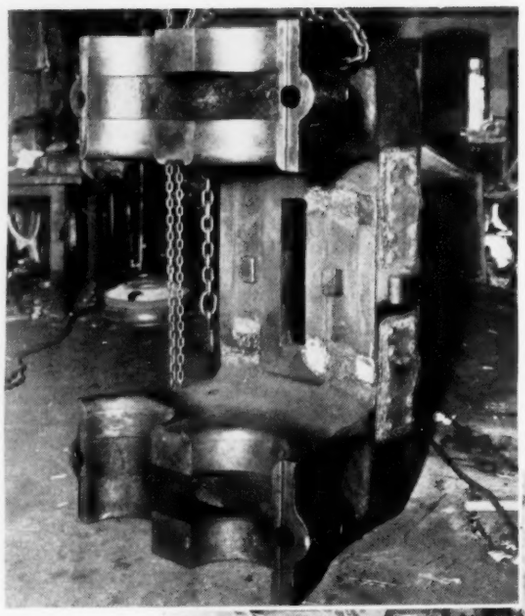
but it is fairly certain to translate itself in greater comfort and less fatigue on the part of the worker.

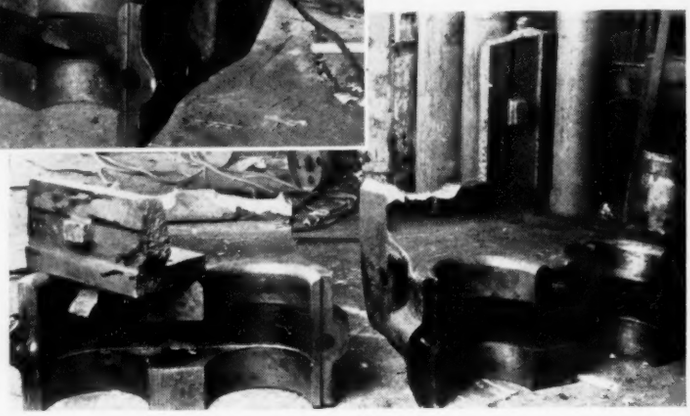
This factor is illustrated in another way in Fig. 4 which plots results of a number of laboratory experiments, divided into two groups: (1) Experiments in which the subject was required to perform visual work only; and (2) experiments in which the subject was required to perform various mechanical tasks guided by vision. Results for each group are plotted on a chart, the abscissae representing the brightness of the background (intensity of illumination for reflection-factors of background).

Comparison of the average results of the two types of experiments indicates that the advantage to the eyes of higher levels of illumination extends considerably beyond the limit of appreciable increased production. In other words, the worker does not necessarily utilize the facilities for better seeing entirely for working as fast as possible but rather effects a compromise and uses a part of the advantage of better lighting in making his work easier. Therefore, as higher levels of illumination are used, the "factor of safety" for the eyes is increased and ocular strain is correspondingly decreased.

However, since the functioning of the human machine is the result of a host of applied stimuli, the lighting specialist is faced with a difficult task when he attempts to isolate the effect of but one factor—light—from the many present. The problem is difficult even in the research laboratory where precautions can be taken to minimize variables and to control them. Extensive foundational research data are needed to reduce the "spread" of results.

(This is the third and concluding installment of a series of articles on the general subject of lighting and seeing in industry).





This badly broken forging machine head was repaired by arc welding method. Bottom view indicates the scope of the repair problem. Top view shows the repaired head ready to be placed back in service

Broken Forging Machine Head Repaired At Small Expense by Arc Welding

UNABLE to locate the pattern for a new casting to replace a broken forging machine head, a forgings manufacturer decided to use arc welding to repair the old one. A new casting would have cost $1000; the welding job came to only $200, a saving of 80 per cent.

The 3-ton head of the forging machine, made of high-grade cast iron, had been broken in three pieces, as shown in one of the accompanying illustrations. The repair work was done by the Menna Welding Co., Toledo, O., which prepared the fractures for welding by cutting away a small amount of the metal and inserting a number of steel studs in the surfaces to be united.

Welding was done with an arc-welding generator and electrodes supplied by the General Electric Co., Schenectady, N. Y. The first layer consisted of about 50 pounds of type A welding electrode whose properties make it particularly suitable for bonding to cast iron. The breaks then were completely filled in with type F electrode, approximately 150 pounds of the latter being required.

When the job was finished, as shown in the illustration, the head was put back in place on the forging machine, and so accurate had been the calculations for expansion that it was found unnecessary even to scrape a bearing before putting the machine into service.

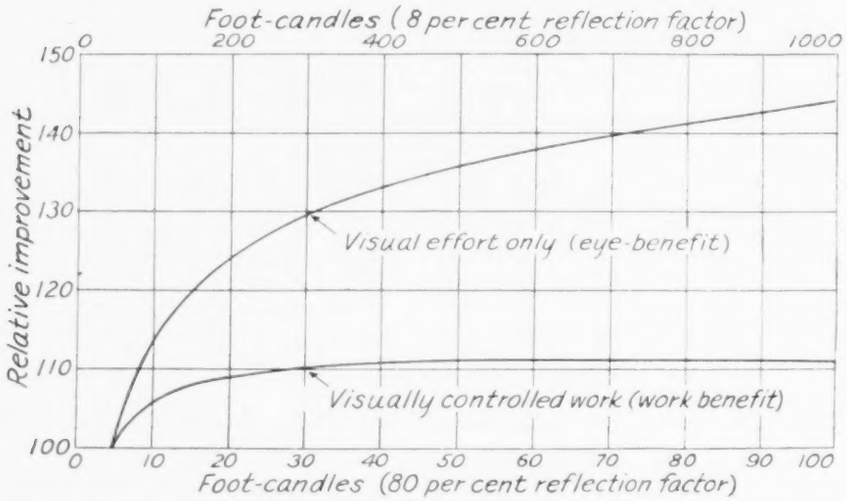
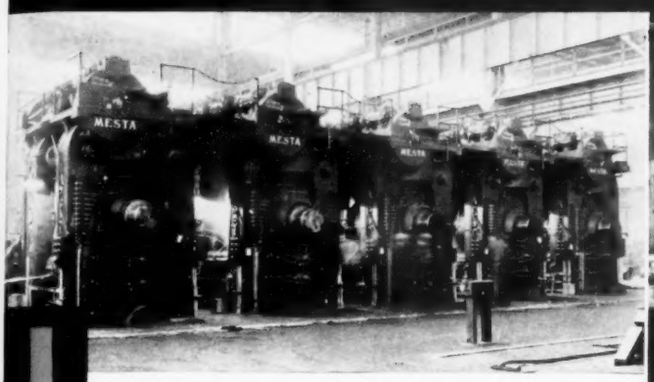


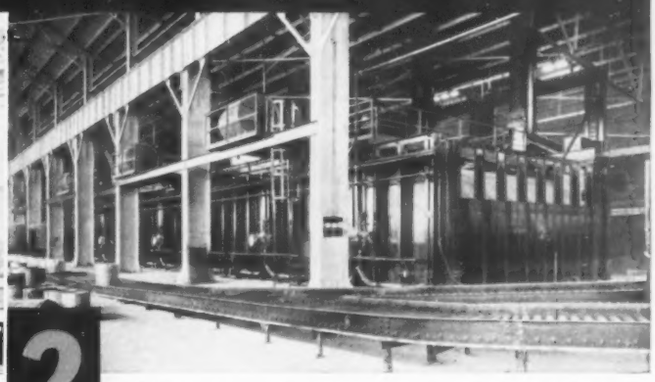
Fig. 4—"Eye-benefit" curve summarizes the results of several experiments involving simple visual recognition of test objects. "Work-benefit" curve summarizes the results of experiments involving the performance of various tasks guided by vision

Why the Inland Tin Plate Mill Is Important to You · · · a User



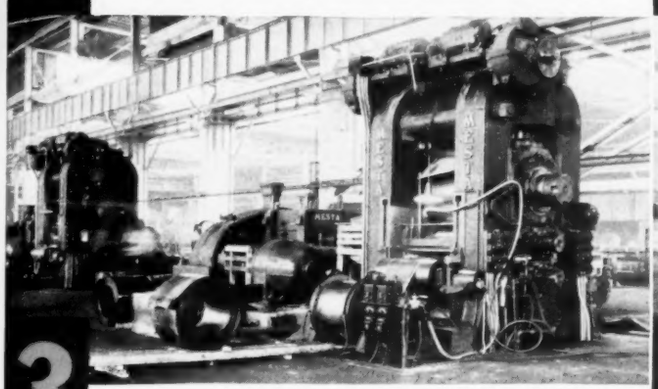
1

Tandem of five huge, 4-high roll stands embodying latest engineering advances, for reducing strip to tin plate gages.



2

Battery of annealing furnaces where reduced strip is annealed for skin rolling.



3

Skin rolling mills—4-high type—where strip is finished to Inland standards.

4

After shearing to size, black plate is tinned in this battery of pots by best method yet developed.

5

Inland Tin Plate carefully inspected here under the best of lighting conditions, assuring shipment of only the most satisfactory material.

THE best available equipment is the first requirement for producing tin plate of highest quality. Only then do skill and experience have their chance.

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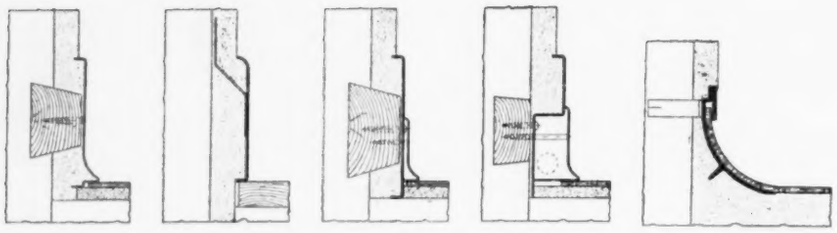


Skirting boards and fillets of sheet metal

Trends in Architectural Use of Sheet Metal Products

BY FRANCIS LORNE

AS ONE examines the more recent structures in various parts of the world today, it is surprising to realize how far sheet metal products have penetrated into the construction of modern buildings.

Shortly after the steel frame was invented it was found that the old manner of climbing by ladders from floor to floor was inconvenient. It became necessary to invent a form of stair which would be strong enough to stand the rough usage of preliminary work in building and yet capable of serving the function of ground work for the finished stairs. This was solved by means of the sheet metal stair. This stair goes up with the steel frame, is used for the period of building construction and finally clothed with various material finishes. We have not yet arrived at the final solution of this light steel stair because there is the prevailing tendency among architects not to treat it as a steel stair on its own merits but to dress it up with stone, marble, terrazo, etc., in fact, to make it look like the traditional stone stair of a dead period. The error of this is twofold. It is first bad design to make it appear something which it is not, and second it merely loads the structure with unnecessary heavy materials which is uneconomic. For universal application the solution lies in the near future with the frank acceptance of the sheet metal product by designing it on its own terms.

Doors and Door Frames

The flush metal door and frame is being used in increasing numbers today in which metal plate is used as a finish on a core of cork or laminated wood, and can be used quite economically provided there is a sufficiently standardized quantity, treated as metal in sheet form. The difficulty with much of this produce on the market is its cost, which arises chiefly out of the abortive method of making the doors and architraves imitate wood and heavily molded architraves and applied moldings to simulate panels in wood doors, the whole surface being finally grained in walnut, oak, or some other wood to make the deception complete. Why not make the frame absolutely plain and level with the wall and the door absolutely flush and paint in bright distinguishing colors?

We are using flush metal skirtings and picture moldings more extensively to-day, but they must be plain and flush and not made to imitate wood moldings. At the moment we experience some difficulty with the injunctions at external and internal angles. The solution for the moment is to apply a specially prepared junction on the cover lap principle which we have not found entirely satisfactory. It is possible that the resource of some engineer will produce a convenient light apparatus for cutting and welding the junctions satisfactory in place. A properly cut and welded junction done in place promises better results than the cover lap method used at present. Should we in the future develop the metal partition to more common use the skirting will disappear. Its function at present is to protect the plaster wall at or near the floor line but when plaster goes it will or should go with it.

A number of partitions have been produced which are very satisfactory, but most of these are metal panels in the lower part and glass above. It remains for us to produce an entire metal partition in sections easily assembled on the site. Unfortunately most of these partitions are again made to imitate wood forms with cornices, pilasters, panels, skirtings and finally grained to look like walnut or oak. What utter nonsense! The future in these partitions, whether solid or in glass, lies in the treatment of the design in sheet plates according to the material possibilities and limitations. It assumes also satisfactory insulation between the two faces of the partition so that sounds will not travel from one room to another. Perhaps the future treatment lies along lines similar to that of the door with cork or other insulating core.

Furniture, Stoves, Etc.

Perhaps the greatest advance the use of sheet metal is in furni in desks, tables, filing cabinets .. cabinets of all sorts, shelving, loc ers, picture frames, trays, kitch dressers, sinks, draining boards, et Most of these are eminently satisfactory especially when wood forms are not copied. Complaint is made sometimes that this furniture is cold to the touch, but this is only true where the rooms are not centrally heated. After all, metal furniture is a part of the modern attitude and so is central heating.

It is a good many years now since the refrigerator and the electric or gas stove passed out of the class of the luxury into that of the necessity. In fact we are installing at present over 600 of a new type of fitting which combines both refrigerator and stove in one unit within a sheet metal cabinet. Both inside and outside of these fittings is enamelled sheet metal. The insulation of the refrigerator has become so perfect that it is not affected by the close proximity of the stove. An extension of this form of insulation opens up for the future enormous possibilities for the treatment of external walls and internal partitions of buildings on the same principle.

With the steady growth of indirect and semi-indirect lighting we have found that the large metal trough for indirect lighting and the large box fixture buried in the structure for semi-indirect lighting is the most

European Opinion Checks With View Held Here

READERS of the accompanying article will be impressed by the fact that the author, who writes from the viewpoint of British and continental European experience, envisions the use of sheet metal products in buildings in a manner very similar to views held by many authorities in the United States. Moreover, the article, which is from an address presented at the International Congress for Steel Development at London, June 20 to 23, indicates that progress in the application of sheet metal to buildings abroad is abreast, or possibly ahead, of that in this country.

—THE EDITORS.

convenient form of housing the electrical outlets where they can be prepared off the site and fitted into the building during construction.

With the increasing demand for conditioned air in buildings, ventilating ducts through which fresh air is supplied and foul air exhausted from the rooms, we have found that a sheet metal duct is the most convenient and easily handled form for [illegible]s within the building. With the growth of the multiple building and the large groups of plumbing risers to which access must be possible and convenient, we have found that the sheet metal front or removable panel is the most convenient form of covering these plumbing risers. They fit more accurately, stand frequent removal better, and keep their shape.

We are using sheet steel floors in increasing quantity in boiler and machine rooms, removable in panels for easy access to piping underneath. These floor sheets lie level with one another on small steel members and are serrated on the surface to prevent skidding. Casings to fronts of boilers and covers for pumps in planished sheet steel are also being used to improve the appearance of what used to be the ugly boiler and machine rooms.

One could extend this survey indefinitely, but these examples are sufficient to show how sheet metal has penetrated modern buildings. Why? The answer is that it is probably the strongest, cleanest, lightest, most durable, and most constant material known to us to-day; in addition it is not combustible. It is superseding wood in almost every department of building. With the growth of more central heating, wood is subject to movement, shrinking and splitting under heat and expanding and creeping in a moist atmosphere. It is subject to rot and decay and the harboring of vermin. To all of these, if protected against moisture, sheet metal is not subject.

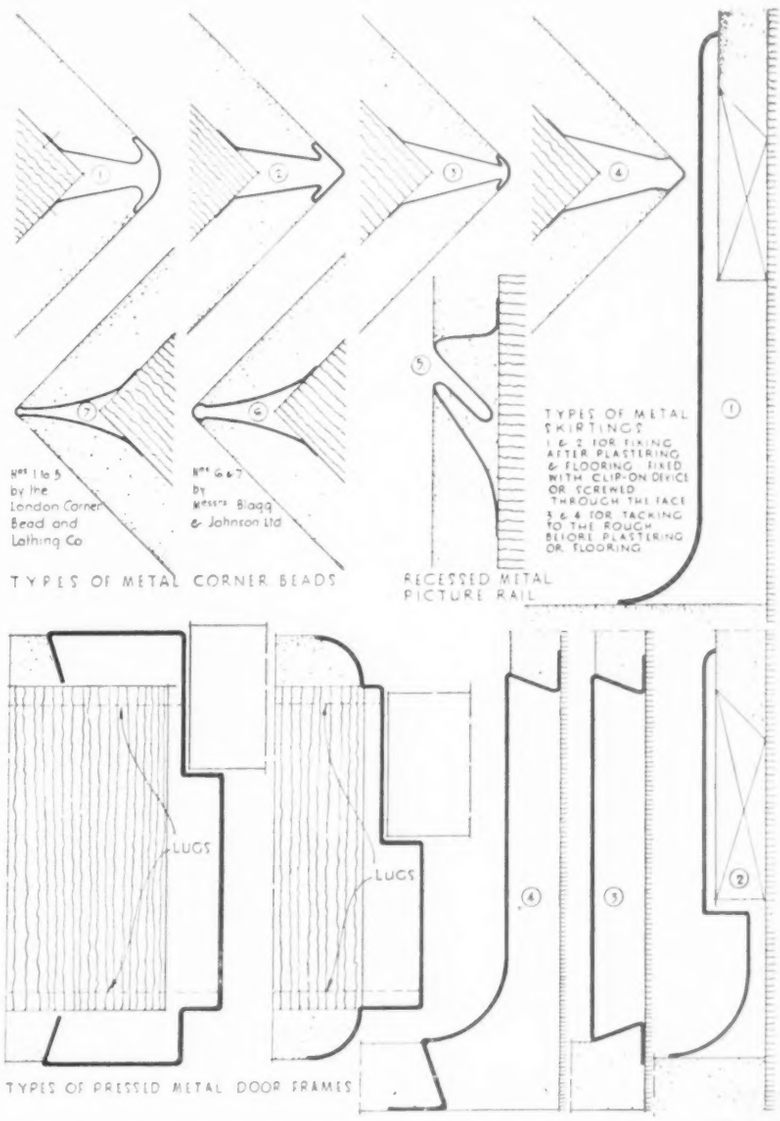
Metal for Exterior

We have seen how metal products have penetrated the complete interior of our buildings where there is a similarity of temperature between room and room and where they are not subject to the inclemency of outside weather conditions. We are awaiting, however, the manufacturers' solution of metal for the exterior of a building where the condition of dissimilarity of temperature exists. Up to the present our results have not been entirely satisfactory. The requirements which must be met in a good exterior sheet metal covering are, that the material must be able to withstand the great variations of heat and cold with the wearing quality of dust and grit in high winds; it must be satisfactorily insulate from a winter temperature without to a summer temperature within, or alternatively to preserve a cool temperature within with a high summer temperature without; it must also withstand the effect of condensation behind external plating. The satisfactory solution of this type of walling will probably lie along the lines of walls treated similar to those of refrigerators, or the household thermos flask.

Let us see if we can indicate one or two directions in which this may be found. Provided we find a satisfactory permanent material of sheet metal for the exterior face of the building it will be necessary for us to produce on this surface a satisfactory finish which may be inherent in the material itself, or it must be capable of having a satisfactory finish applied. The finish inherent in the material itself may lie along the line of copper, aluminum or stainless steel produced at market prices. It will not be necessary for it to be exactly comparable in cost with the present external walling because the new form will be light as the old form was heavy, and we shall be able to take advantage of the lightness of the wall in the new form to reduce the size of the steel frame and incidentally the whole weight and cost of the building. On the other hand if the material in itself is not capable of a good finish it may be possible to apply a finish to it which may lie along the lines of cellulose as applied to the exterior of the modern motor car or colored enamel as on the outside of refrigerators. It will be necessary for us to consider the transportation of the sheets of material, their size, convenience in handling and the fastening of them either by tap screws or welding to the steel frame. The insulation of these exterior walls may be done by either cork or aluminum foil similar to that of refrigerator walls, but whatever the form, it must meet the exacting conditions of suitability for purpose and must be brought to a market value.

We are entering an age of building where flexibility is increasingly important. It is essential today that buildings be assembled with a view to change, not only internally but

(*Please Turn to Page* 46)


Nos 1 to 5 by the London Corner Bead and Lathing Co
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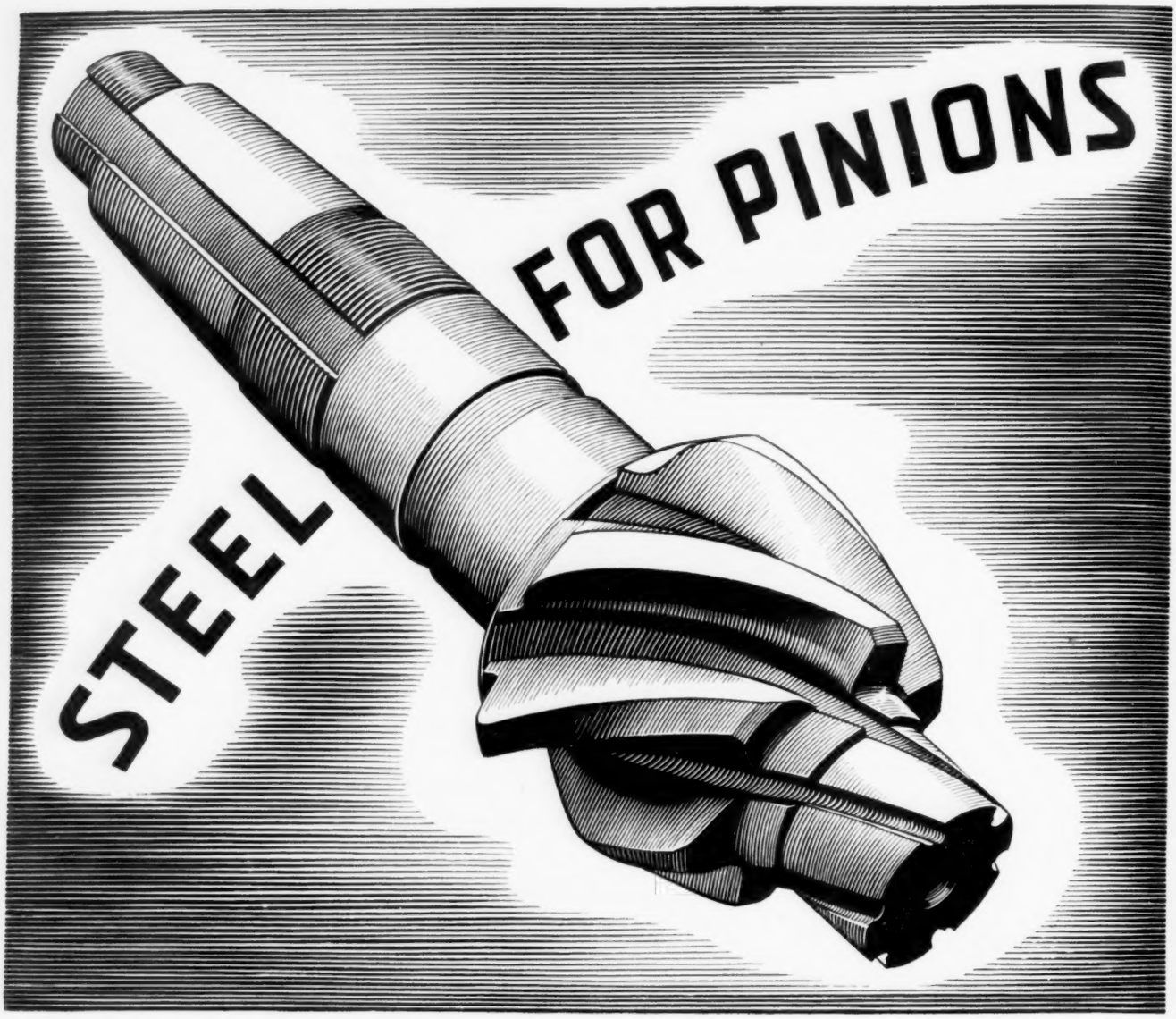
TYPES OF METAL CORNER BEADS
TYPES OF METAL SKIRTINGS
1 & 3 FOR FIXING AFTER PLASTERING & FLOORING, FIXED WITH CLIP-ON DEVICE OR SCREWED THROUGH THE FACE
2 & 4 FOR TACKING TO THE ROUGH BEFORE PLASTERING OR FLOORING
RECESSED METAL PICTURE RAIL
LUGS
LUGS
TYPES OF PRESSED METAL DOOR FRAMES

Typical light sheet metal sections for interior trim in modern construction



FOR this highly-stressed part a nickel-molybdenum carburizing steel, usually of an analysis corresponding to S. A. E. 4615, is generally considered to offer the best possibilities for obtaining both the hard surface that insures wearing properties and the tough core that imparts strength.

But this moderate degree of uniformity in practice with respect to analysis by no means makes the buying of the steel a cut-and-dried matter. In many characteristics, particularly those affecting operations in the automobile plant, steels made to the same specifications may vary widely.

Upon those matters of immediate vital concern to the automotive manufacturer, namely, machinability and uniformity of heat-treating characteristics, Bethlehem has brought to bear every resource of knowledge and skill. Bethlehem's experience on these problems has been acquired through years of living with the steel problems of the automotive industry.

With Bethlehem Nickel-Molybdenum Gear Steel heat after heat moves smoothly through the factory's heat-treating department. The number of gears per grind on the gear generator can be pushed up to a figure that means real savings in machining cost. Tooth strength is the highest that the analysis is capable of developing. Warpage is at a minimum.

BETHLEHEM STEEL

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BETHLEHEM *fine* ALLOY STEELS

Improving Gear Castings By Use of Alloys

Use of nickel alloy iron for heavy gear castings is especially effective in eliminating porosity. Aside from the well-known advantages of the material, such as its greater strength, wear resistance and more uniform hardness without chill, there is the ease with which sound and dense castings may be obtained, and the elimination of open grain and porous sections, particularly at the roots of the gear teeth where maximum stress may be imposed. Another consideration is the improved machinability due to freedom from hard spots which tend to dull the tips of the tools. These improvements, resulting in lower scrap losses and machining costs, far more than offset the slight increase in initial cost of the alloyed material as compared with that of unalloyed gray iron. Material used for this purpose is of the nickel-chromium type. A high percentage of steel is used in the mixture and a very dense and fine grained alloy is produced, showing a transverse strength of 4500 pounds, a tensile strength of 45,000 pounds per square inch, and a brinell hardness of 225.

\$ \$ \$

New Torch Facilitates Applying of Solder

The customary method of applying solder fittings is to use one of three kinds of torches. The oxyacetylene torch and the ordinary gasoline blow torch used by plumbers are widely used for this purpose. A torch now being applied on such jobs is one recently developed for burning propane. The solder customarily employed in these fittings contains equal parts of lead and tin and has a melting point of about 450 degrees Fahr., consequently, any torch which develops heat in excess of 1000 degrees is useful for this purpose. Solder fittings are made with the solder already placed in recesses inside the joints or they have holes into which solder in the form of $\frac{1}{8}$-inch round wire is fed. In either design the soldering is accomplished by capillary attraction after the metal has passed the melting point.

\$ \$ \$

A striking example of the high impact strength of nickel cast iron gears, as compared with ordinary gray iron, was obtained when a large press was tested at double the normal speed. During the test a large piece of metal fell into the gear train and instantly stopped the press. In spite of the tremendous kinetic energy thrown suddenly on the gears they did not break.

\$ \$ \$

Changes Gear Design

A midwestern manufacturer of blowers and gas pumps has developed a flexible tooth gear for use on larger sizes of its equipment. These gears, having epicycloidal addendums, with radial flanks, are designed to have at least three teeth in working contact at all times. The individual tooth is designed to flex a fraction of a thousandth of an inch at the time when it comes into initial contact with its mating tooth, and is said to allow the pressure to be dis-

VALVE DISK HARDFACED FOR LONGER WEAR: This illustration, by Haynes Stellite Co., Kokomo, Ind., shows the method of depositing cobalt-chromium-tungsten alloy on a 9-inch valve disk used in a high temperature, high pressure, steam line. After preheating to 1100 degrees Fahr., the disk was faced with a $\frac{1}{8}$-inch layer of hardfacing alloy, then reheated to 1250 degrees and furnace-cooled

tributed among the three pairs of teeth which theoretically are under load. The feature claimed for this design is that it results in the maintenance of a better oil film and practically eliminates shock forces and acceleration forces. The cast iron mixture used in the gears contains 40 per cent steel, 1 per cent chromium and 2 per cent nickel. The metal shows a tensile strength of 42,100 pounds per square inch with a standard arbitration bar.

\$ \$ \$

Heat Treating Alloy Cast Drawing Dies

Use of alloy cast iron for drawing dies on many parts, both large and small, is the practice of a large automobile manufacturer. The alloy has the following composition: Nickel, 2.00; chromium, 0.70; manganese, 0.45; silicon, 1.25; and total carbon, 3.25 per cent. Dies made of this alloy are heated to 1500 degrees Fahr., quenched in oil, reheated to 900 degrees, and cooled in air. The resultant hardness ranges from 286 to 321 brinell. The comparatively low cost, ability of the metal to fill out intricate and thin sections and ease of machining make the cast iron alloy useful for many die purposes.

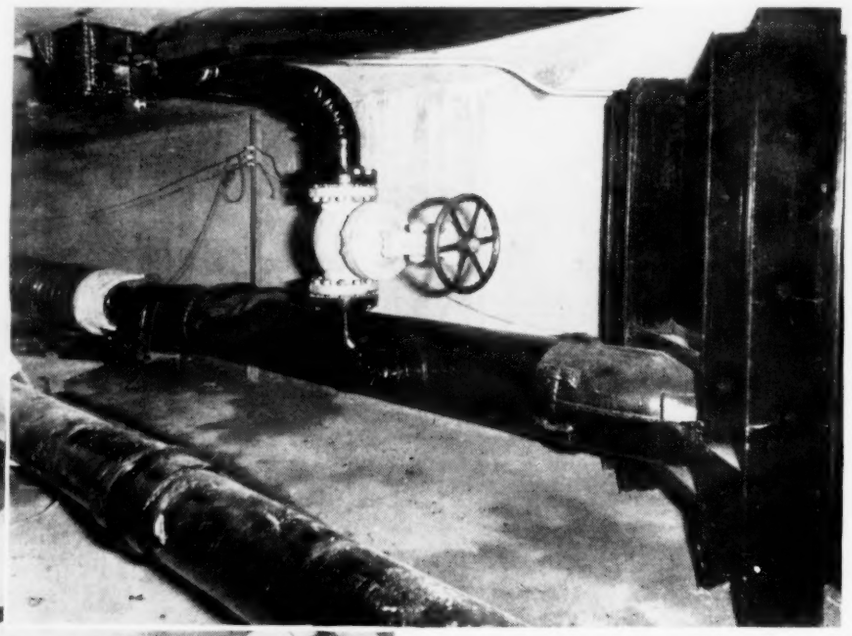
In the case of large cast dies, it has been customary practice in the past to salvage them by replacing the worn drawing points with steel inserts. With this cast iron alloy, however, it is more economical to cast new dies.

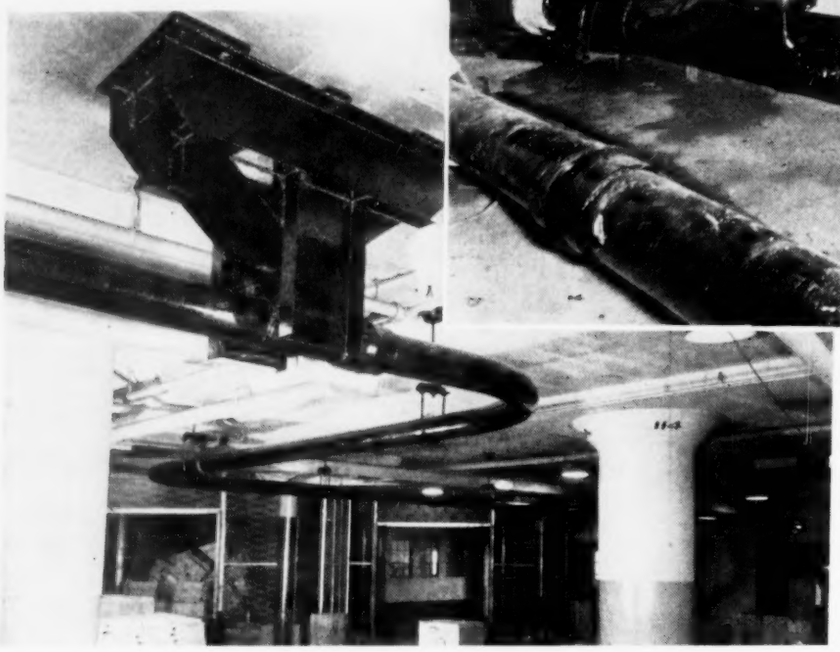
When the dies are too large to heat treat, the following composition is employed: Nickel, 3.00; chromium, 0.90; manganese, 0.90; silicon, 1.45; and total carbon, 3.00 per cent. The castings are allowed to cool completely in the mold. This gives a hardness of 280 to 300 brinell. Best results are said to be obtained with the use of electric furnace iron, but a good die iron can be made in the cupola with reasonable care. While not quite as hard as the heat treated alloy iron, this mix has shown excellent resistance to abrasion.

\$ \$ \$

Bonded Bakelite, Rubber Useful New Product

Among recent developments is a sheet of laminated bakelite and rubber. These materials are bonded together alternately to combine the extreme resiliency of rubber with the strength, rigidity, electrical and solvent-resisting properties of bakelite.





STEEL PIPING SYSTEM ADDS TO SUPPLY OF HEATED AIR IN NATION'S CAPITOL: Most of the federal buildings in Washington, including the White House, now are heated by steam conveyed to these buildings from a central station by means of 42,800 feet of underground pipe lines. The district served is bounded by Sixth street N. W., E street N. W., Twelfth street N. W. and C street S. W. Included are the Commerce, Post Office, Justice, Treasury, Labor, Interstate Commerce, Agriculture, Printing, Court House, Patent office, Smithsonian institute and other buildings. The line is designed for 300 pounds working pressure. High pressure steam mains range from 18 to 4 inches in diameter, while condensate, return and drip mains range from 1¼ to 10 inches. Specifications called for 246 slip type and packless expansion joints, numerous expansion loops, steam flow meters and much intricate piping work. The job, involving more than \$1,250,000, was executed, under contract from the Treasury department, by the Northeastern Piping & Construction Co., North Tonawanda, N. Y., construction subsidiary of the American District Steam Co. All the pipe joints and sleeves, necessary structural steel work, guides, anchorages, etc., were welded by the shielded arc method, using elctrodes and machines manufactured by the Lincoln Electric Co., Cleveland

The number and thickness of the individual layers may be varied to produce a section of any given thickness or characteristics. Possibilities for the new material readily suggest themselves, particularly where quietness and strength are significant factors. For example, it is suitable in vibration absorbing mountings for motors in electric refrigerators, washing machines and fans.

\$ \$ \$

When considering the lower alloy steels up to the austenitic range, molybdenum is unique in its enormous effect in increasing creep strength. The creep resisting properties of this element are applied in a myriad of uses ranging from high temperature furnace parts to boiler tubes. Tests have shown that there is no alloy known which has even one-half the creep resisting effect of molybdenum. Used alone, molybdenum has very little effect upon the oxidation or corrosion resistance of iron and steel. Nevertheless, it in-

MODERN ROLL TECHNIQUE

• DEPENDABLE •

Delivery of rolls on time is often a matter of grave importance. The entire Pittsburgh Rolls Organization unites at all times to keep faith with their customers. Rush orders are expedited through all operations by an expert and smooth working personnel and delivered on scheduled time. This is just one instance of reliability as expressed by Pittsburgh Rolls.

PHOENIX Steel
For unusual strength.
PHOENIX "A"—(Steel Alloy)
For strength and wear.
PHOENIXLOY (Uniformly Hard)
For flat rolling where high finish of extremely thin gauge material is required to be free from all marks or defects.
PHOENIX Metal
PHOENIX "K" (Iron Alloy)
For strength, wear and finish.
PHOENIX Chill
PHOENIX Nickel Chill
For all flat rolling requiring finish.
Also Tube Mill Rolls of quality material best suited to the kind of service required.

PITTSBURGH ROLLS CORPORATION
PITTSBURGH, . . PA.

tensifies the corrosion-resistant properties of other elements, such as chromium, silicon and copper.

S S S

A northern New England foundry is using 1.00 per cent nickel and 0.35 per cent chromium in grate bars for the local gas company. Prior to using nickel, 24 grate bars were supplied every two months. With nickel-chromium iron, 12 grate bars every six months are sufficient. In other words, the life of the bars is increased six times by using alloyed iron.

S S S

Stellite is highly resistant to abrasion and often is a suitable material for inserts in sheet or strip steel forming dies. One large automobile body maker frequently repairs its dies by grinding and welding with stellite rod. The surface then is finished by grinding.

S S S

A Swedish inventor is claimed to have solved the problem of soldering aluminum with an ordinary soldering iron at low temperature, the process also being applicable to stainless steel. The invention has been tested at the Physics Institute of the University of Stockholm.

Road foundation consisting of layer of 1/16-inch sheets next to earth, concrete slab and second layer of sheets. An asphaltic covering over the top layer of sheets completes the road

Using Sheets for Road Foundations

An unusual application of steel for highway construction was advocated by N. L. Anderson at the International Congress for Steel Development held recently in London. The system, designated as the Duplex system and involving the use of light steel sheets, was described as follows:

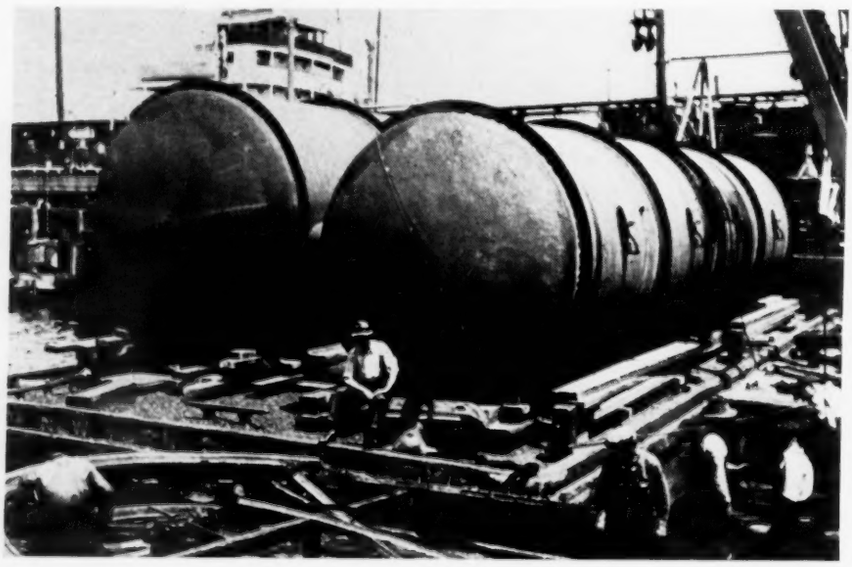
"Assume a type of subsoil which is capacle of carrying a load of one-half a ton a square foot. The grass is removed and the surface trimmed down to the required profile of the finished road. If desired a bed of sand 1 inch thick can be spread over the surface, but this is not essential.

"On this prepared surface are laid a series of mild steel sheets, say $\frac{1}{16}$-inch thick. The sheets are laid in tiers across the road, the joints being butted or very slightly lapped and so that the joints in one tier are staggered in relation to the joints in adjacent tiers.

"These sheets can go direct from rolling mills to the road, the necessary workmanship being done on them at site with a simple and cheap machine. This workmanship consists essentially of providing steel shear members which are attached to the sheets. The spacing of the shear members may be varied to suit the weight of traffic, but 6 inches is a normal arrangement. Upon the bottom layer of sheets which have been laid in the manner described above, concrete is poured to a depth of approximately 3 inches. Immediately thereafter a further layer of steel sheets is laid down on the wet concrete. Joints between the sheets in the top layer are arranged in staggered fashion as in the bottom layer and are further so arranged that joints in the top layer do not occur over joints in the bottom layer. Means are provided whereby adjacent sheets may be inter-connected both in the top and in the bottom layers in such a way as to develop the full strength of the sheets.

"Where the roadway curves, the lapping of adjacent sheets in either layer is increased accordingly so that no specially shaped sheets are required for the purpose of turning curves.

"Means are provided for pressing down the top layer in close contact



STEEL PONTOONS SUPPORT NEW SEAPLANE RAMP: New York is building its first seaplane ramp, at the foot of Wall street, to permit operation of a daily commuter air service to and from Long Island points. A second aircraft terminal of this kind is to be located at the foot of East Thirty-first street. Four of these large steel tanks were built for the first ramp; two, serving as inboard pontoons, have 12-inch inside diameter and are 46 feet long, with $\frac{3}{8}$-inch walls and $\frac{7}{16}$-inch heads; the other two, serving as outboard pontoons, are 11 feet in inside diameter and 46 feet long, with $\frac{5}{16}$-inch walls and $\frac{3}{8}$-inch heads. Steel plates placed on 11.3-foot centers divide each tank into four watertight compartments. Total weight of the tanks was about 48 tons. Joints, aggregating about 6000 feet, all were are welded in the Buffalo Tank Corp.'s plant at Arlington, Staten Island, N. Y. Welding was done with ¼-inch bare wire, using arc welders manufactured by Hobart Bros. Co., Troy, O. The ramp itself was built in the Brooklyn navy yard and weighs 165 tons with area of 45 x 85 feet to accommodate a turntable, fueling station, waiting room for passengers and other features

with the concrete for 48 hours until the concrete has set. On the upper surface of the top layer is placed the asphaltic or other carpet which may form the road surface."

Mr. Anderson declared that this construction affords a marked saving in materials and in excavation and other preparation of the road bed. The concrete is poured on to a continuous steel surface. The water in the concrete is therefore retained and the correct chemical action takes place. Further, the concrete is at once covered by the top plates and is protected from atmospheric and other damage during the period of setting.

He also states that the cross-sectional area of steel in the top and bottom plates is sufficient to absorb the stresses due to temperature changes. There is thus no need to provide expansion joints and the whole of the roadway is a continuous slab in all directions. This eliminates the difficulties which arise owing to loads approaching the edges of the slabs; and it ensures a continuous top surface.

The finished concrete slab, he declared, being protected by the clothing of steel sheets from rain and subsoil water, is free from the disintegrating effects of weather.

According to Mr. Anderson, the Duplex system involves the use of about 400 tons of steel per mile, and the highway constructed in this manner is competitive in price with concrete slab foundations on normal soil. The comparative economy of the Duplex road, he states, increases as the load-bearing quality of the soil decresaes until it reches its greatest value when crossing bogs, marshes, etc.

\$ \$ \$

The analysis of a metal recommended for cast iron dies to be used for medium duty work and relatively deep drawings is as follows; Total carbon, 2.75 to 3.00; manganese, 0.60 to 0.90; phosphorus, under 0.30; sulphur, under 0.12; silicon, 1.25 to 1.50; nickel, 1.50 to 2.00; and chromium, 0.25 to 0.50 per cent. The metal has a tensile strength greater than 50,000 pounds per square inch.

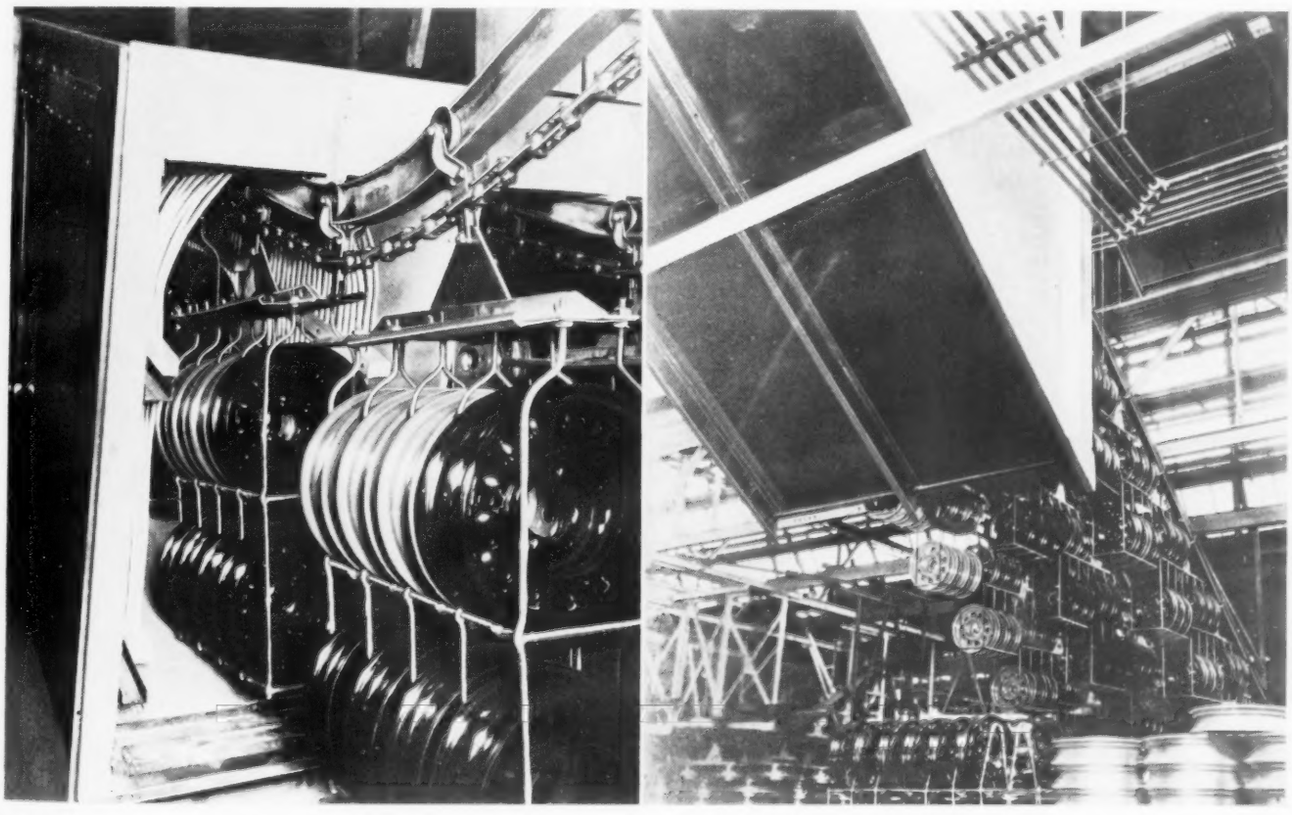
Induction Heating Principle Is Basis Of New Electric Drying Oven

AJAX ELECTROTHERMIC CORP., Ajax Park, Trenton, N. J., by arrangement with the Chrysler Corp. and the Edward G. Budd Mfg. Co., now is offering induction drying ovens on the market. These ovens have been employed by the Chrysler Corp. for some time in drying paints, enamels and lacquers on wheels, fenders, radiator shells, lamps, tire covers, motor blocks and other parts, as well as drying moisture from bodies.

Designed on the principles underlying the Ajax-Northrup induction melting furnaces, the drying of coated metal parts begins in the layers next to the metal and thus proceeds to the exterior surface of the coating. By this method the work to be dried is at the highest temperature in the furnace oven, the air surrounding the work being 50 to 75 degrees lower than the work itself. As a result, heat loss by radiation is negligible. An important advantage claimed for this oven is elimination of explosion and fire risk. There is no high temperature flame which might ignite explosive fumes.

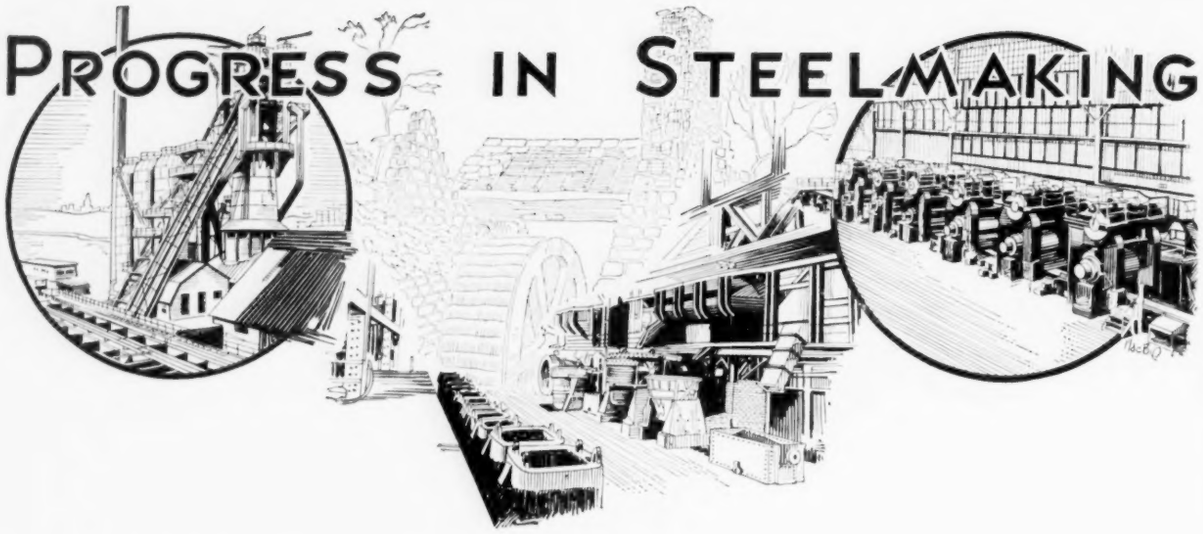
Because the drying proceeds from the coating next to the metal, it has been found in practice that any number of coats which can be laid on the work without sagging, may be dried at one time. This oven, it is claimed, has materially reduced the time formerly required in drying coated parts.

Of compact design and construction, these ovens offer flexibility in the choice of location. Some of them have been located overhead in the roof trusses, saving floor space.



New induction oven used for drying painted wheels at DeSoto plant of Chrysler Corp. is shown at left. The right view shows a similar installation at the Plymouth plant of Chrysler Corp.; it is suspended from the roof members, thus saving floor space

PROGRESS IN STEELMAKING



ZINC oxide in collodial form has been incorporated by an English concern into what is known as "keenolise" lubricants for the purpose of producing a hard metallic film on bearing working surfaces, to prevent pitting and corrosion; to lubricate and protect bright parts against corrosion by water and under atmospheric conditions; to reduce wear to a minimum; and to hold the surfaces under high loads. The presence of zinc oxide renders a lubricant anodic to steel, and creates an electrolytic couple which forms an adherent film on the contacting surface. The zinc plates out and produces a hard corrosion-resisting surface. The film, it is claimed, does not build up beyond an ultramicroscopical thickness.

♦ ♦ ♦

Pouring the linings of by-product coke oven doors, particularly at those plants where door brick and mason labor are excessive, large savings have been effected.

♦ ♦ ♦

At an Ohio plant where the chemical laboratory is located on the second floor of the works administration building, a novel arrangement is employed for supplying oxygen to the combustion carbon train. The

oxygen tank is housed in a box-like structure at ground level to protect it from the weather, and the gas at full pressure is led through copper tubing to the chemical laboratory above where it is released to the combustion carbon train at the desired pressure. When the supply of oxygen is exhausted the foregoing arrangement facilitates changing tanks.

♦ ♦ ♦

Inhibitor requirements at pickling departments now can be produced at the lowest cost per ton of metal cleaned as a result of a motor-driven mixer recently marketed for converting a powdered inhibitor into liquid form. The mixer is filled with acid up to about 6 inches from the top. The motor is started, the powder added, the lid closed and the mixer operated from one to two hours depending on the temperature. The inhibitor solution is added to the acid measuring tank in the proportion of 1 gallon to 2000 pounds of concentrated acid. By this arrangement the concentrated acid flows into the pickling tank properly inhibited, thus relieving the foreman of the responsibility of maintaining the correct quantity of inhibitor in the pickling bath.

♦ ♦ ♦

Casting hollow ingots by a new process soon will be undertaken on a commercial scale in England. The process will greatly facilitate and lower the cost of producing large hollow forgings for chemical works, etc. The hollow ingot as soon as stripped from its mold, is charged into a reheating furnace and forged immediately, thereby dispensing with the long annealing operation and machining in such a way that the solid core can be removed from it.

♦ ♦ ♦

Corrugated cinder pots for handling open-hearth slag are of recent development. The thimbles have a holding capacity of 250 cubic feet. Corrugations in the upper third of the ladle afford about 20 per cent more surface for radiating the heat of the molten mass than is possible with ladles of the ordinary type. The life of the thimble is about 300 per cent greater than conventional type open-hearth cinder pots.

♦ ♦ ♦

Application of soft soap and graphite to the walls of ingot molds affords clean surfaced ingots according to a Pennsylvania open-hearth operator.

♦ ♦ ♦

Testing cold drawn bars for uniformity is accomplished at a plant in the East by magnetic equipment. A standard steel of the same material and size is employed. Steel bars of essentially the same percentage of carbon but some containing 3 per cent nickel and some 5 per cent nickel readily are assorted as a matter of regular practice. Magnetic analysis permits the producer to guarantee cold-drawn bars free from seams.

♦ ♦ ♦

Recent investigations made abroad show that where sheets are to be cold rolled after cleaning, or where a slight roughness of the surface is

not objectionable, wet scrubbing can be replaced by dry scrubbing with steel or bronze-wire brushes at a material saving in the cleaning cost.

Drop Forging Turnbuckles; New Device May Extend Their Use

FOR three-quarters of a century or more turnbuckles have played an important role in the construction of engineering and mechanical equipment. From the time when they were first pounded out laboriously on a blacksmith's anvil down to the present time, when modern machine methods are employed, they have provided a convenient means of adjustment in tension members not equalled by any other device.

For many years the Cleveland City Forge Co., East Forty-fifth street and Lakeside avenue, Cleveland, has produced turnbuckles by the drop forging method. The product ranges in size from ⅜ to 4½-inch tap, and in the usual commercial lengths inside of opening.

The turnbuckles are forged from steels bars or billets. The smaller buckles are made in one hammer with one set of dies; the larger sizes require the use of two hammers.

In making the larger turnbuckles, the stock is heated in an oil-fired furnace and cropped in a guillotine-type shear to the length required. The piece then is heated to about 2200 degrees Fahr. in a similar furnace. The heated, cropped billet is removed by means of tongs and drop chain and swung into place under a 4000-pound steam hammer equipped with a set of blocking dies. This rough forging operation partially forms the turnbuckle.

It is removed from the dies and delivered to a second furnace for reheating, after which it is placed in another large forging hammer, which is equipped with finishing dies, similar to the set shown in the accompanying illustration. As the turnbuckle is forged to finished shape in these dies, the excess metal or flash which is forced out between the die blocks is trimmed off in a crank press.

While the company employs compressed air for blowing scale out of small forging dies, it uses steam when making large turnbuckles. This is because steam prevents the swabbing oil and scale from accumulating in the bottoms of the deep impression in these large dies.

The die blocks used for making these dies are of high carbon, chromium nickel steel and are purchased after heat treating to the proper hardness, which means a scleroscope hardness of 50 to 55. This hardness range has proven most economical for large dies which have large and deep impressions. By "large" dies is meant anything over 14 inches square and 12 inches high. Experience at this plant over many years has shown that at higher hardness ranges there is a rapid increase in the tendency of the die to check.

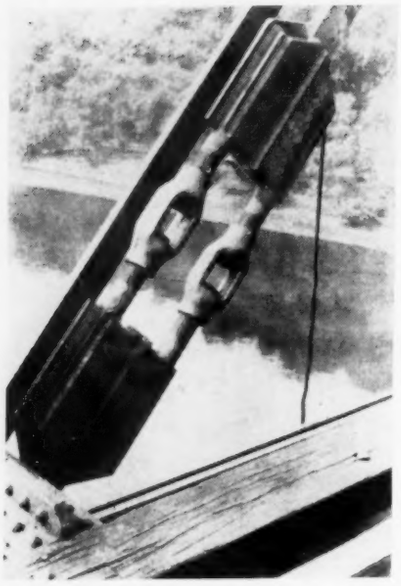
A ⅜-inch and a 4½-inch turnbuckle, showing range in sizes

Typical set of finishing dies for drop forging turnbuckles

Convenient Hardness Range

This hardness range is also about the maximum at which the dies can be sunk after heat-treating. In other words, if a higher hardness range were used it would be necessary to sink the dies before heat-treating, and would mean an expensive hazard in case the dies after being sunk should break in the hardening operation. Sinking of the large dies often means an investment of hundreds of dollars. The company employs the usual precision machinery, such as milling machines and shapers, etc., for sinking its dies.

After being forged, the turnbuckles are placed on trays and transported by elevator conveying trucks to the machine shop where the ends are drilled and tapped. These operations are performed in special machines. Each has two spindles, in direct line



"Pittweld" turnbuckle device designed to take up slack in inactive eyebars on pin and link type bridges

with each other, so that both ends are drilled simultaneously. In the same way, both ends are tapped simultaneously, assuring perfect alignment of the tapped holes. Ordinarily the ends of turnbuckles are drilled in a single operation.

The application of turnbuckles has changed considerably during the past half century. At one time, when nearly all railroad cars were of wood, the railroads were the most important users of turnbuckles by a large margin. With the advent of all-steel cars, the use of turnbuckles was materially reduced, although the railroad field still represents an important market.

A New Use for Turnbuckles

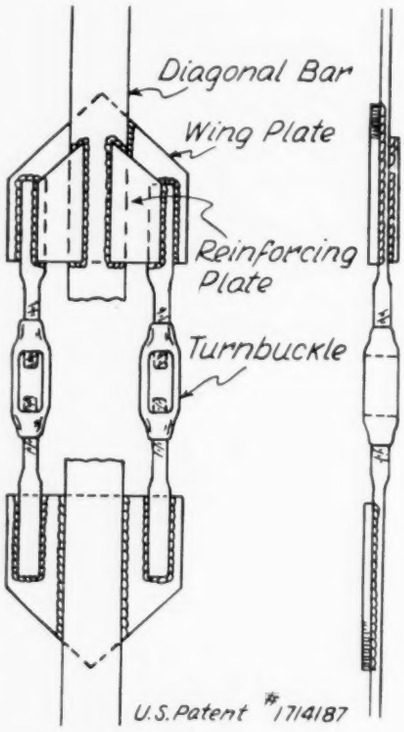
Today the uses of turnbuckles probably are more diversified than ever before. The principal uses are for railroads, ships, engineering and mechanical equipment, oil country and mining and quarrying equipment, bridges, etc.

A recent development, which promises to extend the use of turnbuckles is the Pittweld turnbuckle device, shown in the accompanying illustrations. This unit, developed by the Pittsburgh Welding Corp., Pittsburgh, and protected by United States Patent No. 1,714,187, was designed especially to take up the slack in inactive eyebars of pin and link type bridges.

A bridge of the pin and link type having one or more loose, inactive eyebars due to wear of pins or elongation of eye holes is like a chain with one or more bad links. It can be restored to its original strength by adjusting the inactive bars at small cost and without interfering with traffic by applying the patented turnbuckle devices. This method has been adopted by five leading eastern railroads.

After determining the number of slack bars in each span, the correct size of forged turnbuckle is determined which would develop the strength of the bar section plus adequate factor of safety.

The Pittweld units are then assembled and welded in the shop and shipped to the site. After being clamped and welded to eyebar, the latter is cut and turnbuckles drawn up until the dead and live load stresses are found to be the same as in component members of panel in question. Dead load stresses are determined by vibration method and live load by use of strain gages. After completion of work turnbuckles are locked.



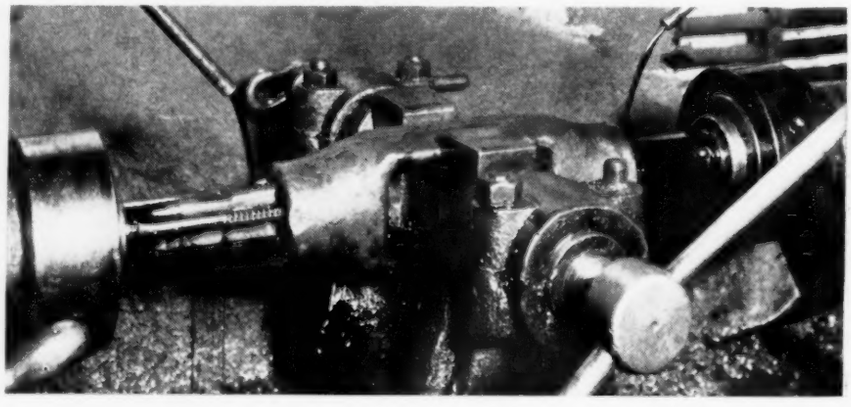
Drawing showing detail of turnbuckle device

Trends in Architectural Use of Sheet Metal

(*Concluded from Page 35*)

externally as well. We are also entering an age when the great proportion of our buildings will have a much shorter lifetime than they have had formerly. The conditions are changing so rapidly that it is difficult for us to build beyond our own generation, and more difficult every day for us to dream what our children will require. This condition of rapid change is leading us to consider a new type of building which is capable of variation and capable of scrapping and rebuilding more easily and at less cost than the older and more rigid forms. The nonsense of building for hundreds of years must be exploded. It must be apparent to most people that buildings today are being pulled down because they are out of date. Buildings become out of date in a much shorter period of time than a century. They really become out of date at the end of our own generation and sometimes before. The demolition loss in the old type of building was extremely high because it was built mostly of brick or stone which had little value in re-use and became largely waste. We must evolve a type of building which will have a high value in re-use and make it possible to entirely rebuild at much less loss of money.

It would seem that the future building will tend more and more to be constructed almost entirely of steel and glass with an insulation material which will also have a good value in re-use. These buildings of the future with steel frame, with walls, partitions and floors of light sheet metal, efficiently insulated, the surfaces, exterior and interior, treated with color, the rooms supplied with conditioned air which means washed, warmed or cooled, fresh air, will provide the future man with an entire control of living conditions over the inclemency of the elements and with a far greater flexibility for his ever changing form of life.

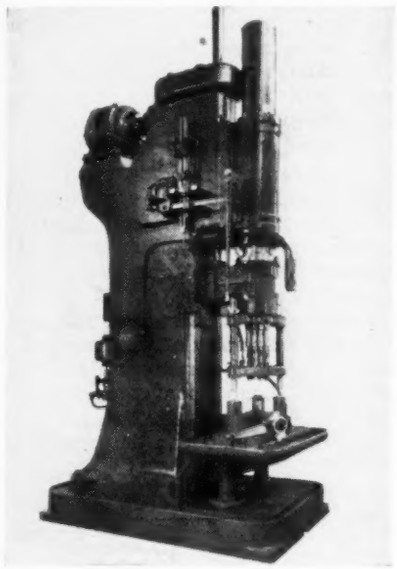


Drilling and tapping are done on special two-spindle machines

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Hydraulic Feed Drilling Unit—Barnes Drill Co., 814-830 Chestnut street, Rockford, Ill., recently introduced a heavy-duty hydraulic feed drilling machine. As shown herewith, the hydraulic ram carrying the spin-



Hydraulic feed drilling machine introduced by Barnes Drill Co.

dle brings the feeding pressure directly above the work.

Driving power goes directly to the cutting tool with a minimum of torsional vibration. This is accomplished through reduction of speed from vertical drive shaft to the comparatively short spindle of large diameter through the gear case carried on nose of ram. Tremendous stiffness and rigidity of the sleeve or ram, which is of equal length on either side of piston, gives a support in the upper bearing (and lower) within the entire spindle travel. Thus the construction absorbs lateral strains through the large diameter securely supported ram.

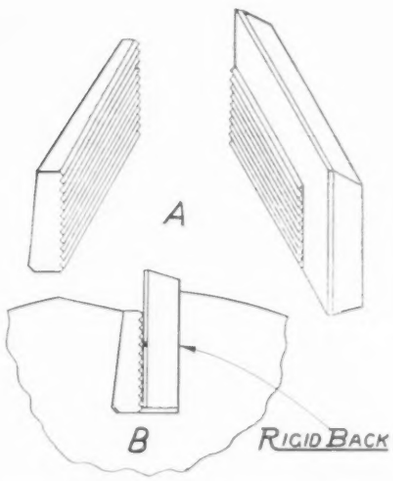
The hydraulic feed drilling machine is being offered for economical production work in boring, reaming and facing operations; also for use with any layout of multiple heads. Here the convenient feature of interchangeability that has been designed into the machine, plays an important role. By special adaptation the "Hydram" unit may be arranged for cylinder boring, and also for independent use in other applications.

♦ ♦ ♦

Serrated Blade Milling Cutter—Cowles Tool Co., Cleveland, recently placed on the market a new type of serrated blade milling cutter known as the "Rigidback" series. This design follows the well-known principle that any cutting tool should be supported rigidly by a true conforming surface. Therefore, the blade shown at *A* in the accompanying illustration, is made parallel with a ground surface on the side mating the cutter body. The double taper wedge is provided with serrations, permitting adjustment of the blade for the purpose of increasing the diameter of the cutter.

Illustration *B* shown herewith, depicts the blade and the wedge assembled in the cutter body, forming a rigid dovetail tooth. All component parts of the cutter can be made accurately since they are readily accessible. The manufacturer claims that a minimum amount of labor and equipment is required to adjust the blades prior to re-sharpening.

Cutter bodies and wedges are made regularly of heat treated alloy steel

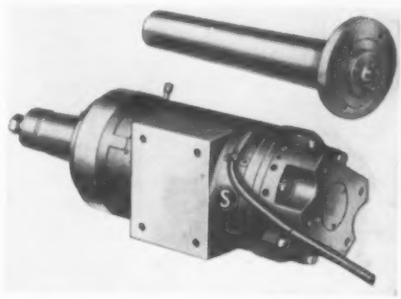


Serrated blade milling cutter developed by Cowles Tool Co.

with high speed steel blades, although cemented carbide tipped blades are well suited for this rigid type of cutter. Standard range includes 51 sizes of eight different styles of cutters. Special applications of this design are being applied in the construction of special tools.

♦ ♦ ♦

Angle Plate Grinder—Standard Electrical Tool Co., Cincinnati, has developed a new 5 horsepower combination angle plate grinder, shown herewith. It is powered by a motor operating at 3600 revolutions per minute. The motor shaft is equipped with two ball bearings while the grinding wheel spindle is equipped



Angle plate grinder build by Standard Electrical Tool Co.

with three ball bearings, two of which are located at the wheel end to care for the end thrust. The grinder can be supplied with a solid spindle or with a clutch arrangement so that the short extension is interchangeable with the longer extension. The pad on the back of the grinder is for mounting on a boring mill while the pad on the side of the motor housing is arranged for mounting on the rail of a planer, or can be fitted with a plain angle plate for attaching to a lathe. The machine is supplied for alternating current in 3, 5 and 7½-horsepower sizes, and also may be obtained with vertical or horizontal feed, or with both vertical and horizontal feeds.

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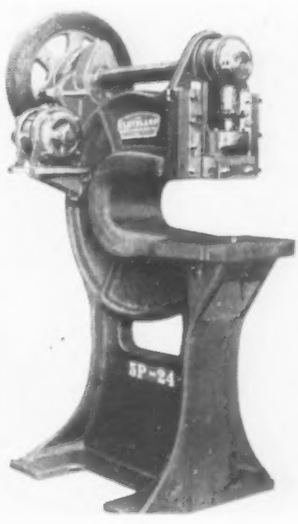
Punch Presses—Cleveland Punch & Shear Works Co., Cleveland, has recently brought out a new line of high-speed deep throat punch type presses. These units, one of which is shown in the accompanying illustra-



Cleveland high-speed deep throat punch type press

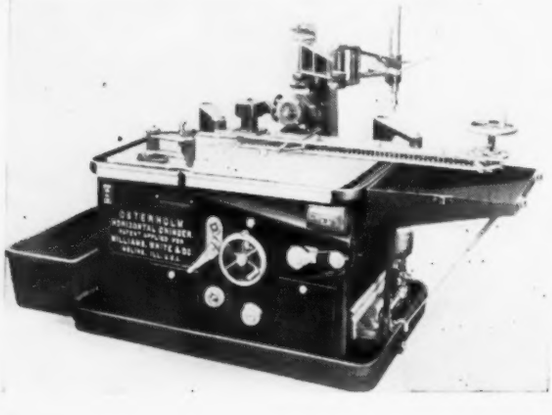
tion, feature long adjustment to the slide instead of the conventional L adjustment. The press shown herewith has a 24-inch throat depth and is of the flywheel type, with direct connected motor drive. This type of press, however, can be supplied in the geared type, with depth of throat to meet requirements. Furthermore, two presses of similar capacity with equal or unequal throat depths can be combined, making one double end machine operated by a single drive.

♦ ♦ ♦

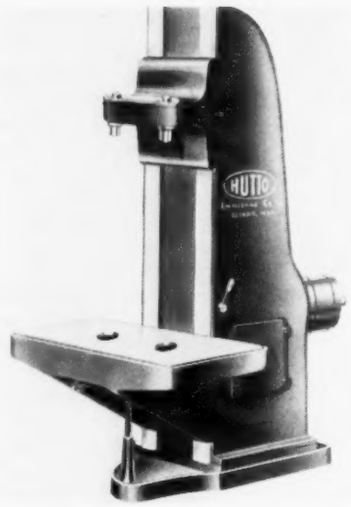
Horizontal Grinder — Williams, White & Co., Moline, Ill., recently introduced a surface grinder, shown below, which is designed to accommodate a large variety of work without elaborate fixturing. The unit can be used to equal advantage in the production line or in the toolroom, as well as for refinishing operations or for grinding rough castings, being recommended for finishing of such parts as washing machine castings, cylinder blocks, cylinder heads, agricultural implements, etc. It also will grind the bevel edge on cutter knives, and has many special uses.

Metal is removed from the lower side of the work as it passes over the wheel. The work is prevented from lifting either by its own weight or by a hold-down which is provided. Lowering or raising the table over which the work approaches the wheel, exposing more or less of the edge of the wheel to the work, removes the metal. Work is passed over the wheel at a uniform rate by means of the mechanical feed, consisting of a motor driven chain with work driving lugs. The rate at which the chain moves is variable by means of the change gears.

When the machine is in use, the wheel is set so that it is flush with the top of the center plate. Therefore, work passing from the feed table across the wheel to the center plate and take-off table travels in a true plane and flat surfaces result.



SURFACE grinder introduced by Williams, White & Co. The frame is a one-piece box section mounted in a heavy cast-iron water pan, providing a rigid support for the center plate column. Feed table rests on tapered ways and is raised or lowered by moving the table to and from the wheel by a crank



Model V-300 honing machine announced by Hutto Engineering Co. Inc.

The horizontal grinder consists essentially of a ring wheel mounted on a vertical spindle. The spindle is direct motor driven; that is, the motor is pressed directly on the spindle. The spindle and its housing are mounted in vertical guides in a frame, and can be raised to compensate for the wear of the wheel by a graduated handwheel and screw.

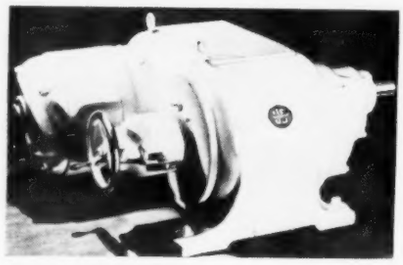
This new machine is a wet-type grinder. Water is introduced through the spindle, where it is dispersed through ducts in the center plate to the point of contact of the work on the wheel. Thus work of all kinds, including hardened parts, can be ground without danger of warping or loss of temper.

♦ ♦ ♦

Honing Machine—Hutto Engineering Co. Inc., 515 Lycaste avenue, Detroit, recently announced a new model V-300 honing machine. This unit, shown above, provides the required balance of motions with which to hone internal and external diameters consistently straight to extremely close limits. Principal features include "harmonic" reciprocating motion and absence of "shock" at the ends of the stroke and upon reversal of reciprocation; positively controlled length of reciprocating stroke; complete synchronization of the rotary motion with the reciprocating motion; impossibility of "stalling" the reciprocating motion when hone encounters a constriction in the bore or becomes overloaded otherwise. The rotary and reciprocating motions are affected simultaneously and proportionately and the balance established remains unaffected.

Coincidental mechanical lift-out control of hone is provided, as well as varying speed changes in rotating and reciprocating motions to suit varying diameters and lengths of bores. The machine makes possible automatic positioning of stroke-stop on upper extremity of working stroke bore with an optional complete withdrawal of hone upon stoppage if so desired.

This new unit can be made for single spindle or multiple spindle operation. For single spindle duty, the machine can be supplied with fixed rotary and reciprocating speeds. Where the machine is to be used for utility purposes, two, four, six or eight speed changes for either or both motions can be supplied. When the machine is purchased with one fixed speed change for a particular diameter and length of bore and it is later desired to adapt the machine for other diameters and lengths of bores, this is readily accomplished by purchasing the required gears for the desired speed changes. The installation of these gears is easily made, requiring but a few minutes.



"U. S. Varidrive" motor is finding numerous applications in industry

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Geared Motor—U. S. Electrical Mfg. Co., 202 East Slauson avenue, Los Angeles, is announcing the development of a new geared motor with a thousand speeds, for the steel and machinery industries. It offers

any and all speeds over a wide range without intricate control mechanisms. Merely by turning a wheel the speed of the motor can be increased or decreased. The unit, called the "U. S. Varidrive" motor, is shown on page 48. This motor is a self-contained unit instead of having extraneous gear changing devices and it embodies an electromechanical power conversion which changes the fixed constant speed of the motor to variable speeds at the take-off shaft.

Bailey adjustable orifice for measuring air to carburetors on test

Variations of 1, 10 or 100 revolutions or more are available.

The "Varidrive" consists of a simple squirrel cage motor built integral with a variable speed transmission. The latter comprises dual disks coupled with a varibelt. Speed changes are obtained by varying the effective diameter of the disks. The operator merely turns a handwheel which actuates a traveling hub. This, in turn, increases or diminishes the distance between the two sides of the driven disks. The motor is asbestos-protected.

• • •

Adjustable Orifices—Bailey Meter Co., 1050 Ivanhoe road, Cleveland, has furnished the United States Navy with two large adjustable orifices for use in testing aircraft carburetors under actual flying conditions. One of these orifices, pictured above, will be installed in a 16-inch line and the other in an 8-inch line carrying air to carburetors on test. This air will vary in temperature from —60 degrees to +200 degrees Fahr. and will be at approximately atmospheric pressure when measured. A refrigeration system, a heating plant and a throttling device are included in the test setup so that air conditions may be varied to simulate flying conditions at sea level and at altitudes up to 30,000 feet for the various tests.

As its name implies, the adjustable orifice accurately measures a wide range flow. In the case of the 16-inch size the gate segment may be set to accommodate a maximum capacity of 450 pounds per minute of 200-degree Fahr. air as well as a minimum capacity of 20 pounds per minute of —60-degrees Fahr. air with equal accuracy. This high accuracy over a wide range of capacities is accomplished by a micrometer adjusting screw which permits setting of the gate segment to within 0.001 inch.

When a change in conditions makes it advisable to readjust the capacity of the orifice, it is simply necessary to set the micrometer screw at a reading corresponding to the desired capacity as obtained from curve sheets furnished with the orifice. This operation is done in a few minutes without disrupting meter operation or flow through the pipe line.

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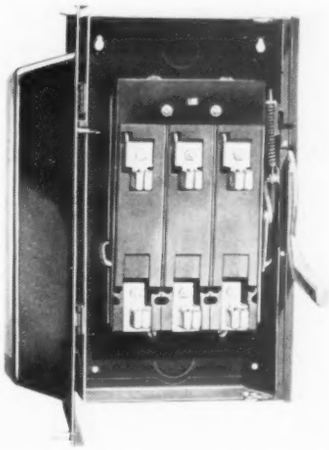
Electric Switches—Square D Co., Detroit, recently announced the addition of 100 and 200-ampere



One of the new switches added to the Square D line

switches to the new 50,000 line of type A switches marketed by its Switch & Panel division. This completes the line up to and including 200-ampere switches in either standard sheet metal boxes or cast aluminum enclosures, with cast iron enclosures optional, if specified.

The new 100 and 200-ampere numbers have all the features of the 30 and 60-ampere switches of this line, with some added points necessitated by the higher capacities. They are quick-make, quick-break, with interlocked covers and elevated removable bases for easier wiring. The enclosures are considerably smaller than those of the conventional type of knife switch due to the compact design of the interiors.

The entire line now includes 230 volts alternating current-250 volts direct current and 575 volts alternating current-600 volts direct current switches in two or three poles, 3-wire solid neutral and 4-wire solid neutral, fusible and not fusible.

• • •

Tumbler Switch—General Electric Co., Schenectady, N. Y., recently announced a compact, easily-installed starting switch, designed for use when hand-operated control at the motor is required and intended for direct mounting on the built-in terminal box of standard GE fractional-horsepower motors.

The device, shown below, which is completely mounted in a substantial steel case and is provided with a positive snap-action mechanism, is simple to install. It replaces the standard terminal-box cover-plate and requires no soldered connections or additional wiring.

The switch is of the single-pole type, rated 6 amperes at 125 volts or 3 amperes at 250 volts. Typical applications include valve grinders, cylinder reborers, drills and paint sprayers.

• • •

Lifting Magnet—Ohio Electric Mfg. Co., 5900 Maurice avenue, Cleveland, has incorporated improvements in its lifting magnet and controller which afford quick dropping ability of the magnet and minimize

Motor-mounted General Electric tumbler switch

arcing at the control contacts. The new controller is equipped with lavite indestructible arc shields and thyrite arc suppressor, which not only reduce arcing but so rapidly reduce the current flow to zero as to insure quick release of the load from the magnet. Principal improvements in the magnet involve the use of a strip copper coil 12½ per cent heavier than in the former design and this coil is attached detachably to the top case of the magnet, so that when the bolts holding the center pole shoe and the outer rings are removed, the top carrying the coil can be lifted clear. The new center pole shoe or the outer ring can be removed and replaced without disturbing any other parts of the magnet. The 55-inch and 65-inch magnets are heavier and, because of increase in weight of copper, they have greater all-day lifting capacity and will operate cooler. All these improvements have undergone a long period of test.

What Mass Acceptance Of Household Appliances Means To Industry

(*Concluded from Page 27*)

best be met by a better understanding of the over all problem than existed when the automobile industry, in its infancy, presented a parallel challenge.

Then leaders in many of the basic industries made the mistake of under-rating the possibilities of the automobile. When automotive enginers asked for new and better materials and parts, the response from the metalworking industries was not enthusiastic. The motor car industry had to take the initiative in metallurgy and in other fields of development, where the metalworking industries themselves should have led the advance.

Today industrial executives have it within their power to avoid making this mistake. They have the chance to co-operate with the promising, new appliance industry in developing materials, parts and services. The possibilities are unlimited.

Much still remains to be done in adapting materials to the varied requirements of design and construction of household appliances. Competition between alloys of steel, nonferrous metals, nonmetallic compounds, etc. still is wide open, with high stakes for all earnest contestants. In forming, shaping and fabricating metals the choice of processes and methods still is broad enough to encourage every aspirant. The problem of coatings or finishes, which probably is more important in the appliance field than it was in the automobile industry, opens up untold possibilities.

If the thousands of companies in the metalworking industries accept this new challenge with a will to avoid the mistakes of the past, the country will witness the unfolding of a thrilling new drama in the evolution of American industry. It will see vast improvement which, for the first time on a broad scale, will be keyed more to the requirements of the market than to the convenience of production facilities.

If, as now seems inevitable, an increasing portion of the total effort of industry will go into products which are sold directly to the public, then it is certain that the practice of designing articles to fit the pocket books of consumers in definite income groups will become more firmly established.

The significance of this as a broad policy in American industry will not be lost upon the executives of metalworking establishments. It will cause many of them to approach their problems from a different angle.

New Trade Publications

HEATING EQUIPMENT—A bulletin by the Gorton Heating Corp., Cranford, N. J., No. 100, describes its single pipe vapor system of heating and radiator valves.

ESTIMATING CARD—Newman Bros. Inc., 416 Elm street, Cincinnati, has prepared for free distribution a reference and estimating card covering its line of bronze fittings.

MACHINE PARTS—Struthers-Wells Co., Warren, Pa., in bulletin M-13 covers its Struthers-Weld certified machine parts, of all commercial metals. It describes the wide range of parts it is equipped to produce and the facilities available for service.

CHEMICALS—Dow Chemical Co., Midland, Mich., in a booklet on its chemicals lists over 250 products, including heavy, industrial and other chemicals. Scientific data are given which are sufficient to determine the application of the products to a given use.

PIPE THREADER—Landis Machine Co., Waynesboro, Pa., in a current bulletin describes its "Little Landis" pipe threading and cutting machine, designed for jobbing and maintenance threading for economical operation, flexible, productive and accurate.

MAINTENANCE—Linde Air Products Co., 30 East Forty-second street, New York, has published a booklet on maintenance of reciprocating parts. It deals with application by the oxy-acetylene process of wear-resisting bronze to the wearing surfaces of sliding parts.

ELECTRIC FURNACE—A high-temperature tube furnace is described in bulletin HD-834, by the Hevi Duty Electric Co., Milwaukee. It is designed chiefly for carbon determinations in ferrous alloys where temperatures of 2000 to 2300 degrees F. are required.

RUBBER TIRES—B. F. Goodrich Co., Akron, O., has published a booklet on its new line of rubber tired wheels for industrial trucks. The booklet discusses advantages of that type of wheel, gives data concerning operating tests and illustrates uses of the wheel.

PUDDLED IRON—Reading Iron Co., Philadelphia, has compiled an interesting booklet on the antiquity of the puddling process as applied to iron, revealed through a documentary evidence of historical records. It is edited by Dr. Frederick Cremer, of the company's staff.

SPEED REDUCERS—D. O. James Mfg. Co., Chicago, in its catalog No. 137 covers its line of generated continuous-tooth herringbone speed reducers and gears in a wide variety. It is well illustrated, with ample tables of specifications and horsepower ratings. A torque table is a feature.

ROLLED STEEL—A booklet entitled "Sizes We Roll," by Inland Steel Co., Chicago, has been issued in a new edition. It includes size data on all Inland products except rails, track accessories and tin plate, with much additional information. Gage, weight and bundling tables are included.

V-FLAT DRIVES—Dayton Rubber Mfg. Co., Dayton, O., in catalog No. 160, describes its complete range of sizes in V-flat drives for all drives up to 300 horsepower or more, for industrial service where large speed ratios and short centers are involved. In this type of drive the large pulley is flat instead of grooved.

PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J., among recent bulletins has issued one on its type R, single-stage volute centrifugal pumps; type L, single-stage volute; types C, CA and CB centrifugal pumps; another bulletin describes its vertical four-cycle, direct-injection diesel engines, type B.

AIR CONDITIONING—Clyde R. Place, Graybar building, New York, has published an interesting booklet entitled "Air Conditioning Planned and Proved." The text discusses the development of air conditioning, the results accomplished by air conditioning, and the savings which may be secured by the use of that process.

PNEUMATIC TOOLS—A bulletin, No. 2037A, has been issued by the Ingersoll-Rand Co., Phillipsburg, N. J., dealing with the company's drills and push-throttle screw drivers and nut setters. It includes size and capacity tables of the company's pneumatic drills, grinders, riveters, chippers, rammers, wrenches, hoists and other tools.

ROLLER BEARINGS—Bantam Ball Bearing Co., South Bend, Ind., has published a new catalog on straight roller radial and roller thrust bearings, with complete listings. Dimensions and capacities in inch and metric sizes are included. A table of speed factors and general modification factors and a table on tolerances and fitting practices are also given.

Steel Rate Gains; Market Sentiment Brightens

Operations at 20½ Per Cent—Moderate Start Made on Buying for 1935 Automobiles—Large Structural Projects Maturing—Increasing Pressure Against Prices

WITH a 2½-point rise in steelworks operations to 20½ per cent last week, indications of substantial purchasing by automobile manufacturers within two or three weeks, and more public construction projects maturing, sentiment in the iron and steel markets is brighter.

The third quarter, drawing to a close, finds few parallels in recent years for the prolonged absence of steel consumers from the market, while consumption has been far outstripping production, depleting many manufacturing stocks, a fact convincing steelmakers new requirements cannot be deferred much longer.

While users with considerable inventories on hand are urging producers to hold firmly to present prices, pressure from others—who admit their meager buying recently has been inspired by hope of obtaining lower figures—is becoming more insistent. Increasingly, attention is being focused on the national administration for a clarification of its future price control policy.

Despite this impasse over prices, however, business from the automobile industry was moderately better during the week. Chrysler, Chevrolet and others have placed orders for parts for new models, and these makers have purchased material. Automobile manufacturers themselves expect to be in the market for tonnages late this month or early in October.

Prospective Structural Tonnage Heavier; Some Railroad Equipment Orders Pending

In the next few weeks some of the largest steel construction projects in many months are coming to a head, with bids on 56,000 tons for the Los Angeles water district; 30,000 tons for the Coulee, Washington, dam; 12,000 tons for the Fort Peck, Mont., dam; 4472 tons for the Trempealeau, Wis., dam; 4000 tons for a bridge at Omaha, and 15,000 for a New York postoffice. Actual awards of structural shapes during the week were lower, at 6894 tons. Award of 5000 tons for Chevrolet's Baltimore assembly plant is momentarily expected.

Rail mills have practically no rollings in prospect for several months, though there is a little more activity in equipment. Cincinnati, New Orleans & Texas Pacific has purchased 2000 tons of rails from the Birmingham mill. Lehigh Valley may repair 1500 box cars, and buy 400 gondolas, with a loan of $3,000,000 approved, instead of building 1900 cars in its own shops as announced by the PWA. It also will buy three locomotives.

Equipment builders are protesting against higher quantity extras on steel to go in effect Oct. 1, claiming these will considerably increase their costs. Locomotive builders, planning lighter types, show more interest in high tensile steels. In the construction of deck houses for four navy destroyers recently awarded a considerable amount of stainless steel will be used. An award of 542 tons of boiler tubes was made by the navy on 20 uniform bids, by drawing one name from a hat.

Scrap Index Lowest Since December, 1933; Better Demand for Sheet Bars Lifts Rate

In raw materials, little demand has developed for scrap and prices are softer, STEEL's iron and steel scrap composite dropping 17 cents to $9.37, lowest since December, 1933. While spiegeleisen prices, like ferromanganese, have been extended for fourth quarter, foreign manganese ore prices in this country have been advanced, reflecting heavier consumption abroad.

British iron and steel demand continue to expand, according to STEEL's London cablegram. Pig iron output in Great Britain in August was 503,300 tons, off 4.5 per cent from July; and steel ingots, 667,000 tons, down 7 per cent. In the same period American pig iron and steel ingot production dropped 13.7 and 7.4 per cents, respectively.

Pittsburgh district steelworks rate last week advanced 5 points to 13 per cent, mainly in response to larger requirements for sheet bars. The Chicago rate was up 1 point to 24; Youngstown, also up 1 to 24; eastern Pennsylvania, up ½-point to 16. Cleveland was off 6 to 18; Birmingham, 2 to 23. Detroit was unchanged at 77, New England 25, Wheeling 23, and Buffalo 19.

Influenced by the reduction in scrap, STEEL's iron and steel price composite is reduced 3 cents to $32.14; the finished steel index remains $54.

COMPOSITE MARKET AVERAGES

	Sept. 15	Sept. 8	One Month Ago Aug., 1934	Three Months Ago June, 1934	One Year Ago Sept., 1933	Five Years Ago Sept., 1929
Iron and Steel Composite	$32.14	$32.17	$32.24	$32.96	$30.36	$36.20
Finished Steel Composite	54.00	54.00	54.00	55.08	48.52	57.43
Steelworks Scrap Composite	9.37	9.54	9.98	10.32	10.83	16.39

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average forLast Month, Three Months and One Year Ago

	Sept. 15, 1934	Aug. 1934	June 1934	Sept. 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.90	1.60
Steel bars, Chicago	1.85	1.85	1.95	1.70
Steel bars, Philadelphia	2.09	2.09	2.09	1.91
Iron bars, Terre Haute, Ind.	1.75	1.75	1.85	1.60
Shapes, Pittsburgh	1.80	1.80	1.85	1.60
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.90	1.65
Tank plates, Pittsburgh	1.80	1.80	1.85	1.60
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.90	1.65
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	2.00	1.70
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.65	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.25	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	2.10	1.75
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.75	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.35	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.65
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$30.00	$26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	30.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	29.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00

	Sept. 15, 1934	Aug. 1934	June 1934	Sept. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	$19.76	$19.76	$19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	17.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern, No. 2, Birmingham	14.50	14.50	14.50	.....
No. 2X, Eastern del. Philadelphia	20.63	20.63	20.63	18.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.54
Gray forge, del. Pittsburgh	18.88	18.88	18.88	18.26
Ferromanganese, del. Pittsburgh	89.79	89.79	90.00	87.24
Scrap				
Heavy melting steel, Pittsburgh	$10.75	11.45	11.90	13.00
Heavy melt. steel, No. 2, east. Pa.	8.00	8.40	8.85	9.90
Heavy melting steel, Chicago	8.50	9.25	9.75	9.95
Rails for rolling, Chicago	10.25	10.50	11.25	11.25
Railroad steel specialties, Chicago	10.00	10.25	11.25	10.75
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	2.50
Connellsville, foundry, ovens	4.60	4.60	4.60	3.15
Chicago, by-product foundry, del.	9.25	9.25	9.25	8.75

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.40c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 2.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05¼c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75c-7.50c

REINFORCING

New billet, cut lengths, carlots

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis, on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars □

Hot Rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo. 0.50
4600 .20 to .30 Mo. 125-1.75 Ni. 1.05
5100 .80-1.10 Cr. 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon van. 0.95
9250....Carbon base plus extras

Strip and Hoops □

Hot strip to 23½-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham, base	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pittsb., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts	70 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off in bulk, 15,000 or more of a size.	
Rolled thread machine bolts, ½x6 and smaller,	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10 off
Do., larger than 1-in.	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. less than 5 kegs; no discount on size extras	$3.20

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25 72
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½, butt weld	57½
⅛-inch, but weld	50½
¼—⅜, buttweld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts.. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron; 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
3-in & over, east fdy	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville Fur.	$3.60- 3.85
Connellsville fdry	4.60
Connell. prem. fdy.	5.10- 5.35
New River fdry	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, Del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	$0.19
90 per cent benzol	$0.19
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do. (100 lbs.)	0.173c

Eastern Plants, Per Pound,

†Naphthalene flakes and balls, in bbl.	6.00

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh dist. from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50

†Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.25	Lake Superior fur.	21.00
Pitts. dist. fur.	18.25	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.75; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos...	9.50
Spanish No. Africa basic, 50 to 60%..	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%.....	7.00
Chrome ore, 48% gross ton, c.i.f.....	$18.00

Manganese Ore

(Nominal)

Prices, not including duty. cents per unit, cargo lots.

*Caucasian, 52-55%	26.00
*So. African, 52%...	26.00
*So. Afr., 49-51%...	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK

First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala.....	40.00

Ohio

First quality	$40.00
Intermediary	36.00
Second quality	25.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago....	54.00
Birmingham, Ala....	52.00

MAGNESITE

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash.	22.00

BASIC BRICK

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20%, dom. fur. spot†	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload..	85.00
Do., 75 per cent..	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb. 2% carbon 95.00; 1%	90.00 105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., allow., lb.	7.00
Do., under 1 ton..	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper

Sheets

Yellow brass (high)	14.50
Copper, hot rolled....	16.00
Lead, cut, to jobbers	7.50
Zinc, 100-lb. base....	9.50

Tubes and Pipes

High yellow brass..	17.00
Seamless copper	17.25

Rods

High yellow brass..	13.00
Copper, hot rolled..	13.25

Anodes

Copper untrimmed..	13.75

Wire

Yellow brass (high)	15.00

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
New York	4.37½-4.62½
*Chicago	4.12-4.37½
*Cleveland	4.50- 5.00
St. Louis	4.25- 4.50
Heavy Copper and Wire	
*New York	5.75- 6.00
*Chicago, No. 1	5.62½-5.87½
*Cleveland	5.25- 5.50
St. Louis	5.25- 5.50
Composition Brass Borings	
New York	4.12½-4.37½
Light Copper	
New York	4.50- 4.75
*Chicago	4.35- 4.50
Cleveland	4.75- 5.00
St. Louis	4.25- 4.50
Light Brass	
*Chicago	2.12½-2.37½
*Cleveland	2.25- 2.75
Lead	
New York	2.87½-3.12½
*Cleveland	2.65- 2.90
Chicago	2.75- 3.00
*St. Louis	2.85- 3.00
Zinc	
New York	2.00- 2.25
Cleveland	2.00- 2.25
St. Louis	2.50- 2.75
Aluminum	
*Clips, soft, Cleve.	12.00-13.00
*Borings, Cleveland	6.00- 7.00
*Mixed, cast, Cleve.	10.25-10.75
*Mixed cast, St. L...	9.25-10.25

Secondary Metals

Brass ingot, 85-5-5-5	8.75
Stand. No. 12 Alum.	14.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00-10.00
Boston, dealers	5.00- 5.25
Buffalo, No. 1	9.50-10.50
Buffalo, No. 2	8.50- 9.00
Chicago, No. 1	8.25- 8.75
Cleveland, No. 1	8.50- 9.00
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1	7.75- 8.25
Detroit, No. 2	6.75- 7.25
Eastern Pa.	9.50- 9.75
Eastern Pa., No. 2	8.00- 8.50
Federal, Ill.	7.25- 7.50
Granite City, R. R.	7.50- 7.75
Granite City, No. 2	6.25- 6.75
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	6.00- 6.50
Pittsburgh, No. 1	10.50-11.00
St. Louis	6.75- 7.00
Valleys, No. 1	10.50-11.00

COMPRESSED SHEETS

Buffalo, dealers	8.50- 9.00
Chicago, factory	7.50- 8.00
Cleveland	7.50- 8.00
Detroit	7.75- 8.25
E. Pa., new mat.	9.00- 9.50
Pittsburgh	10.25-10.75
St. Louis	5.00- 5.50
Valleys	10.00-10.50

BUNDLED SHEETS

Buffalo	6.50- 7.00
Cincinnati, del.	6.00- 6.50
Cleveland	6.50- 7.00
Pittsburgh	8.75- 9.25
St. Louis	4.00- 4.25

SHEET CLIPPINGS, LOOSE

Chicago	4.00- 4.50
Cincinnati	4.50- 5.00
Detroit	4.50- 5.00
St. Louis	3.75- 4.25

STEEL RAILS, SHORT

Birmingham	10.00-10.50
Buffalo	12.00-12.50
Chicago (3 ft.)	9.75-10.25
Chicago (2 ft.)	10.50-11.00
Cincinnati, del.	10.00-10.50
Detroit	10.00-10.50
Pitts., open-hearth, 3 ft. and less	13.50-14.00
St. Louis, 2 ft. & less	10.00-10.50

STEEL RAILS, SCRAP

Boston	5.00- 5.25
Chicago	8.25- 8.75
Pittsburgh	10.75-11.25

STOVE PLATE

Birmingham	5.50- 6.00
Boston, dealers	3.25- 3.75
Buffalo	8.00- 8.50
Chicago, net	5.50- 6.00
Cincinnati, dealers	5.00- 5.50
Detroit, net	6.00- 6.50
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.00- 5.50

COUPLERS, SPRINGS

Buffalo	12.00-12.50
Chicago, springs	9.75-10.25
Eastern Pa.	12.50-13.00
Pittsburgh	13.25-13.75
St. Louis	8.50- 9.00

ANGLE BARS—STEEL

Chicago	9.50-10.00
St. Louis	7.75- 8.25

RAILROAD SPECIALTIES

Chicago	9.75-10.25

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50-12.00
Cleveland, billet, bloom crops	13.00-13.50
Eastern Pa., crops	13.50-14.00
Pittsburgh, billet, bloom crops	13.50-14.00
Pittsburgh, sheet bar crops	12.50-13.00

FROGS, SWITCHES

Chicago	8.25- 8.75
St. Louis, cut	8.25- 8.75

SHOVELING STEEL

Chicago	8.25- 8.75
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.50- 7.00

RAILROAD WROUGHT

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	10.00-10.50
Chicago, No. 1, net	7.50- 8.00
Chicago No. 2	8.25- 8.75
Cincinnati, No. 2	7.00- 7.50
Eastern Pa.	9.50
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	6.00- 6.50
St. Louis, No. 2	7.25- 7.50

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	8.00
New York, dealers	3.50- 3.75

BUSHELING

Buffalo, No. 1	8.50- 9.00
Chicago, No. 1	7.00- 7.50
Cinci., No. 1, deal.	5.50- 6.00
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	6.75- 7.00
Detroit, No. 1, new	6.75- 7.25
Valleys, new No. 1	10.00-10.50

MACHINE TURNINGS

Birmingham	4.50- 5.00
Boston, dealers	1.50- 1.75
Buffalo	4.00- 4.50
Chicago	4.75- 5.25
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.50- 5.00
Eastern Pa.	5.00- 5.50
New York, dealers	1.75- 2.00
Pittsburgh	7.00- 7.50
St. Louis	3.00- 3.50
Valleys	7.00- 7.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.75- 7.25
Detroit	5.50- 6.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.25- 6.75

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.75- 7.25
Detroit	5.50- 6.00
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	6.25- 6.75
St. Louis	3.50- 4.00

PIPE AND FLUES

Cincinnati, dealers	4.00- 4.50

RAILROAD GRATE BARS

Buffalo	6.50- 7.00
Chicago, net	6.50- 7.00
Cincinnati	4.00- 4.50
Eastern Pa.	8.00- 8.50
New York, dealers	4.50- 4.75
St. Louis	4.00- 4.50

FORGE FLASHINGS

Boston, dealers	4.00
Buffalo	8.50- 9.00
Cleveland	8.50- 9.00
Detroit	6.25- 6.75

FORGE SCRAP

Boston, dealers	4.00
Chicago, heavy	9.50-10.00
Eastern Pa.	9.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	4.00- 4.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	8.00- 8.50
Cleveland	6.00- 6.50
Eastern Pa.	9.00
St. Louis	6.00- 6.25

STEEL CAR AXLES

Birmingham	10.00-10.50
Boston, ship. point.	9.00- 9.50
Buffalo	12.00-12.50
Chicago, net	10.50-11.00
Eastern Pa.	14.00-15.00
St. Louis	10.00-10.50

SHAFTING

Boston, ship. point.	10.50-10.75
Eastern Pa.	15.00-15.50
New York, dealers	10.75-11.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham, iron	8.50- 9.00
Boston, iron deal.	5.75- 6.00
Buffalo, iron	11.00-11.50
Buffalo, steel	13.00-13.50
Chicago, iron	9.50-10.00
Chicago, rolled steel	9.75-10.25
Cincinnati, iron	7.50- 8.00
Eastern Pa., iron	11.00-11.50
Eastern Pa., steel	12.50-13.00
Pittsburgh, iron	9.75-10.25
Pittsburgh, steel	13.50-14.00
St. Louis, iron	7.50- 8.00
St. Louis, steel	8.75- 9.25

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 2	6.00
Boston, tex. con.	9.00- 9.50
Buffalo, cupola	9.50-10.00
Buffalo, mach.	10.00-10.50
Chicago, agri. net	7.00- 7.50
Chicago, mach. net	8.25- 8.75
Chicago, railroad net	7.50- 8.00
Cinci., mach. cup.	8.50- 9.00
Cleveland, cupola	10.75-11.25
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.00-11.50
Pittsburgh, cupola	12.00-12.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	6.50- 7.00
St. L., No. 1 mach.	8.50- 9.00

HEAVY CAST

Boston, del.	4.50- 4.75
Buffalo, break.	7.75- 8.25
Cleveland, break.	7.50- 8.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	9.50-10.00
N. Y., break. deal.	5.50- 6.00
Pittsburgh	10.00-10.50

MALLEABLE

Boston, consum.	11.25-11.50
Buffalo	10.50-11.00
Chicago, R. R.	9.25- 9.75
Cincinnati, agri. del.	7.50- 8.00
Chicago, R. R.	9.25- 9.75
Cleveland, rail	10.75-11.25
Detroit, auto	8.50- 9.00
St. Louis, R. R.	8.25- 8.75
Eastern Pa., R. R.	11.50-12.00

RAILS FOR ROLLING

5 feet and over

Birmingham	9.50-10.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	10.00-10.50
Eastern Pa.	12.00-12.50
New York, dealer	7.50- 8.00
St. Louis	9.00- 9.50

LOCOMOTIVE TIRES

Chicago (cut)	9.50-10.00
St. Louis, No. 1	9.50-10.00

LOW PHOS. PUNCHINGS

Buffalo	13.75-14.25
Chicago	10.00-10.50
Eastern Pa.	14.50-15.00
Pittsburgh	12.25-12.75

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: Futures	Lead: East St. L.	Zinc: St. L.	Aluminum: 98-99%	Antimony: Spot, N. Y.	Nickel: Cathodes
Sept. 8	9.00	9.12½	8.75	51.15	51.20	3.70	3.55	4.15	*22.90	8.62½	35.00
Sept. 10	9.00	9.12½	8.75	51.45	51.25	3.70	3.55	4.15	*22.90	8.62½	35.00
Sept. 11	9.00	9.12½	8.75	51.45	51.30	3.70	3.55	4.15	*22.90	8.62½	35.00
Sept. 12	9.00	9.12½	8.75	51.70	51.55	3.70	3.55	4.15	*22.90	8.62½	35.00
Sept. 13	9.00	9.12½	8.75	51.70	51.45	3.70	3.55	4.10	*22.90	8.75	35.00
Sept. 14	9.00	9.12½	8.75	51.40	51.25	3.70	3.55	4.00	*22.90	8.75	35.00

*Nominal range 19.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*....	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga..	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga..	3.31c
Baltimore*....	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga..	3.31c
Chicago 2.10c-2.60c	
Cleveland (c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl...	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young. 2.30c-2.60c	

SHAPES	
Baltimore* ..	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga..	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*....	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga..	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ¼-in.	3.65c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.55c
New York(d)..	3.40c
Philadelphia*	2.95c
Phila. floor....	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*....	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga..	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles..	3.80c
New Orleans	3.55c
New York.....	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*† ..	3.51c
Boston (g)....	3.90c
Buffalo	3.25c
Chattanooga..	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.93½c
Los Angeles..	4.45c
New York.....	3.85c
Philadelphia*†	3.55c
Pitts.** (h)....	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore *†..	4.21c
Buffalo	4.00c
Boston (g)....	4.55c
Chattanooga..	4.86c
Chicago (h)..	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles..	5.05c
New Orleans	4.95c
New York.....	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*....	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga..	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ¼-in. and lighter	3.38½c
Houston	3.25c
Los Angeles..	3.90c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia..	3.15c
Pittsburgh(h)	3.70c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.80c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia..	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore(c)	3.71c
Boston 4.00c-4.50c	
Buffalo (h)....	3.55c
Chattanooga*	4.06c
Chicago (h)..	3.50c
Cincinnati	3.70c
Cleveland(h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York...3.92c-4.42c	
Philadelphia..	3.73c
Pittsburgh(h)	3.45c
Portland (f)..	4.75c
San Fran.(f)(d)	5.95c
Seattle(f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.56c

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Sept. 6

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
PIG IRON				
Foundry, 2.50-3.00 Silicon.	$15.03	3 0 0	$7.79	1 12 0
Basic bessemer.....	13.53	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05....	15.16	3 0 6	.....	.....
SEMIFINISHED STEEL				
Billets.....	$27.56	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage.....	39.08	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails.....	$38.83	7 15 0	$26.77	5 10 0
Merchant bars.....	1.68c	7 10 0	.69c to .72c	3 2 6 to 3 5 0
Structural shapes.....	1.65c	7 7 6	.68c	3 1 6
Plates, †¼ in. or 5 mm.....	1.79c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.....	2.07c	9 5 0	1.13c to 1.16c	5 2 6 to 5 5 0
Sheets, gal., 24 gage, corr...	2.52c	11 5 0	1.43c	6 10 0
Bands and strips.....	1.85c	8 5 0	.88c	4 0 0
Plain wire, base.....	2.07c	9 5 0	1.18c	5 7 6
Galvanized wire, base.....	2.51c	11 5 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base.....	2.69c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.....	$4.51	0 18 1	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5.....	$16.91	3 7 6	$14.03	210	$14.73	310	$25.44	63
Basic bessemer pig iron....	16.91	3 7 6(a)	*12.36	185	13.54	285	28.06 (b)	69.50
Furnace coke.....	4.38	0 17 6	8.02	120	5.23	110	7.67	19
Billets.....	27.56	5 10 0	28.72	430	20.90	440	38.97	96.50
Standard rails.....	1.85c	8 5 0	2.10c	700	2.42c	1,100	2.42c	132
Merchant bars.....	1.93c	8 12 0	1.68c	560	1.21c	550	2.01c	110
Structural shapes.....	1.96c	8 15 0	1.65c	550	1.21c	550	1.97c	107.50
Plates, †¼-in. or 5 mm.....	1.89c	8 8 9	2.10c	700	1.54c	700	2.32c	127
Sheets, black.....	2.35c	10 10 0§	2.55c	850‡	1.71c	775‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.....	2.91c	13 0 0	4.50c	1,500	3.30c	1,500	6.77c	370
Plain wire.....	2.07c	9 5 0	3.39c	1,130	2.42c	1,100	3.17c	173
Bands and strips.....	2.08c	9 7 0	1.95c	650	1.54c	700	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.

(b) Plus straightening, cutting and quantoty differentials.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

(g) 50 bundles or over.

(h) Outside delivery, 10c less.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Bars

Bar Prices, Page 52

Pittsburgh—Most merchant steel bar buying is in small lots but it is expected that the new quantity differentials, soon to be in effect, will divert more of these orders to warehouses. The market on commercial steel bars remains 1.80c, Pittsburgh, with alloy bars, 2.45c, both unchanged.

Cleveland—An automobile manufacturer placed 500 tons of bars with a Cleveland district seller during the week, believed to be the forerunner of more business from the automobile industry later this month. Specifications, generally light, so far this month are slightly ahead of the comparable period last month. Some producers report the general run of orders as the smallest in size in their experience for several years. The Cleveland bar mills, down last week, are expected to resume production this week.

Chicago—Further improvement in steel bar sales and specifications has not appeared and the market remains listless. Automotive needs are declining but renewed buying by farm implement manufacturers is looked for soon. Tractor builders continue active, demand for this equipment from farm districts being fairly good. Most bar orders are small and fourth quarter contracting is light.

Boston—Commercial steel bars are dull, due to the slow operations by the larger industrial consumers, notably bolt and nut makers. Prices are unchanged at 2.20c, Boston.

Philadelphia—Coal companies are becoming seasonably active in laying plans for repairs for the coming winter months and recently commercial steel bar producers have received an improved volume of inquiry from them. The market continues 1.80c, Pittsburgh, or 2.09c, Philadelphia.

Washington—Bureau of supplies and accounts, navy department, will receive bids Sept. 25 for 28,600 pounds of grade one, round, corrosion-resisting steel bars in 8 to 12-foot lengths.

Plates

Plate Prices, Page 52

Philadelphia—Shipyard requirements continue dominant in the local plate market, although a substantial portion of this business has already been discounted, particularly the requirements of the New York Shipbuilding Co. for its navy cruiser. On the other hand this builder is now in the market for a good tonnage of stainless steel for deck houses for four destroyers this company has on the ways. Contrary, it is said, to its former policy of having this particular work done outside, the New York Shipbuilding Co. will fabricate these deck houses in its own yards. A Pittsburgh fabricator is understood to be low on 330 tons of standpipe work for the Maiden Creek water development at Reading, Pa. Railroad equipment manufacturers and shipbuilders may appeal to the steel code authority to be excluded from those having to pay the new quantity extras on plates and shapes, which become effective Oct. 1. They contend their requirements include many small items of special specifications and that the payment of the new quantity extras would impose an undue burden. Many are items, they point out, which cannot be obtained from jobbers.

Pittsburgh—Pittsburgh-Des Moines Steel Co., Neville Island, last week was awarded three fair-size plate jobs. The largest was 330 tons in work for Reading, Pa., with smaller tonnages for Quincy, Mass. and Grand Rapids, Mich., in all to about 530 tons of plates. Bids will be opened Sept. 21 at St. Louis, for ten steel pontoons and 600 feet of 34-inch discharge pipe. Dravo Contracting Co. last week completed eight sand and gravel barges for the Ohio River Sand Co., Louisville, Ky., recently contracted.

Cleveland—Lake shipyards are taking bids on plates and other material for repairs to ore and coal vessels, contingent on those being authorized by steamship companies this fall. For converting an ore carrier to a self-unloader type 400 tons of plates and shapes have been placed. Recent award of contracts for automobile stamping dies has led to some sales of heavy riser plates for presses. Painesville, O. is taking bids on a fabricated water line and tank, requiring 140 tons of plates and shapes.

Chicago—Except for small lot buying for miscellaneous uses, the plate market is quiet. Heavier orders are in prospect for public works, with bids closing Sept. 24 on 723 tons for the Ft. Peck dam spillway. Bids close Oct. 2 on the Trempealeau, Wis., roller dam, involving a fairly large plate tonnage.

Boston—Plates are slightly more active with some sellers, others noting little gain. Small tank work is more active while water tanks taking near 200 tons have been placed by Quincy and Danvers, Mass. Two others pend in Rhode Island. Most buying, however, is in small lots of miscellaneous sizes.

New York—Following some delay shipyards here are expected this week to place steel for naval ships. Miscellaneous demand is slightly better, with Alco Products Inc., New York, placing 750 tons for pipe for Pine View dam, Ogden, Utah, and several hundred tons for a half-mile pipe line in the District of Columbia.

Contracts Placed

330 tons, standpipe, Reading, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 tons, dredge for Nome, Alaska, to Isaacson Iron Works, Seattle.

100 tons, elevated tank, Quincy, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, elevated tank, Grand Rapids, Mich., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, elevated tank, Danvers, Mass., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

9900 tons, steel or concrete aqueduct, Los Angeles; bids Oct. 3.

1500 tons, tanks, Standard Oil Co., Richmond, Calif.; bids soon.

750 tons, 60 to 72-inch penstock, Pine View dam, Ogden, Utah; Babcock & Wilcox Co., New York, low.

723 tons, dam spillway, Ft. Peck, Mont.; bids to United States engineer, Kansas City, Mo., Sept. 24.

300 tons, 11-foot pipe, Magic dam, Magic, Idaho; bids opened.

Unstated tonnage, 10 full deck steel pontoons, 46 x 22 x 2 feet 8 inches, United States engineer, St. Louis; bids Sept. 21; also 600 feet 34-inch steel discharge pipe.

Sheets

Sheet Prices, Page 52

Pittsburgh—Improvement in demand for autobody sheets and electrical and enameling stock is noted in the sheet market. Another 2-point gain in sheet mill operations places the average at 22 per cent. A small but steady improvement is expected over the balance of September as rural distributors and dealers buy galvanized more actively.

Cleveland—Chrysler, Chevrolet and a few other automobile manufacturers have placed orders for running boards, grills, tanks and other parts for new models, and the partsmakers in turn have purchased moderate tonnages of material. The automobile manufacturers themselves indicate they will be in the market late this month or early October. Other consumers, such as electrical household equipment manufacturers, continue fairly active, in production and purchasing. Sheet mills here and in a

nearby lake district serving the Michigan automobile district managed to operate on light schedule last week.

Boston—Slight, but spotty improvement, is noted in sheet buying. Some carload orders are coming out. The increase is largely due to buying by industrial consumers who failed to stock heavily.

New York—Demand for sheets is a little better, though still spotty.

Philadelphia—Sheet specifications show improvement for the second consecutive week. Stovemakers are issuing more releases. Should the textile strike come to an early close, stove tonnage is expected to show further and much more appreciable gain. Specifications from radio manufacturers have incerased moderately.

Buffalo—District output continues below 20 per cent. The present schedules are likely to be extended for at least another two weeks, producers report.

Cincinnati—Sheet mills in this district last week showed a slight increase in operations to meet miscellaneous demand, with greater activity by radio and stove manufacturers.

St. Louis—Producers and distributors report prospects better than immediate business. Some fair inquiries have developed mainly from miscellaneous users, manufacturing stocks being light.

Railroads

Track Material Prices, Page 53

Lehigh Valley has been allotted $3,000,000 by PWA to finance 1900 freight cars. Reliable information at New York is that the road will repair 1500 box cars at its shops at Sayre, Pa., and buy 400 new cars of 70-ton capacity. Pending approval of the loan specifications have not been issued. Work at the Sayre, Pa., shops is expected to start about Dec.

Placing of 2000 tons of rails by the Cincinnati, New Orleans & Texas Pacific with Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., is the high spot in the week's rail business.

Missouri Southern has been alloted $32,500 for the purchase of a diesel electric locomotive, to be built by the Plymouth Locomotive Works, Plymouth, O.

The Pennsylvania has increased the maximum number of locomotives which may be bought from 55 to 58.

The Pennsylvania will open bids Sept. 26 on plates, shapes, bars, tires, boiler tubes and other steel requirements. Pittsburgh & Lake Erie will close Sept. 27 on fourth quarter requirements of locomotive and car axles and tubes. Norfolk & Western closes Sept. 26 on fourth quarter needs for shapes, plates and bars, estimated at 4500 tons.

Car Orders Placed

Lehigh Valley, repair 1500 freight cars, in shops at Sayre, Pa., with a portion of a $3,000,000 PWA loan and buy 400 gondolas of 70-ton capacity.

Locomotives Placed

Missouri Southern, one 70-ton, 500 horsepower, diesel-electric locomotive, to Plymouth Locomotive Works, Plymouth, O.

Rail Orders Placed

Cincinnati, New Orleans & Texas Pacific, 2000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Locomotives Pending

Chilean State Railways, 10 locomotives, 4-8-4 type; contemplated.

Lehigh Valley, three diesel-electric locomotives; these will be purchased with PWA funds.

Pipe

Pipe Prices, Page 53

Pittsburgh—Approaching end of the open season precludes any hope of important line pipe buying for production over the balance of 1934. Although several large lines still are being discussed, award is made additionally doubtful by financing features. Last week, Pittsburgh Steel Co. was awarded 542 tons of seamless boiler tubes by the navy department for shipment to Mare Island, Calif., Puget Sound, Wash., Norfolk, Va., Boston and Charleston, S. C., yards. Rehabilitation loans prescribed under HOLC have not noticeably benefited pipe producers yet. Pipe mill operations here were slightly better last week at 25 per cent of capacity, and among producers resuming was the Sharon Tube Co., Sharon, Pa., closed for two months.

Chicago—Activity in cast iron pipe gradually is improving as work on PWA projects is pushed. Shipments against old orders also are heavier and in view of the large number of proposed programs for various municipalities, fairly active business is looked for during the next several months. Cast pipe prices are firm.

Boston—Better demand for merchant pipe is reported by several mill representatives in this territory. Cast pipe sales are light, but include 400 tons for the metropolitan district commission. Specifications against contracts have been substantial with indications that pipe will be specified and installed later than usual this fall to aid employment.

New York—Cast pipe buying is mostly in small lots for public works, although some private industrial purchasing is reported to have been done with an eastern foundry. Chester, N. J., is asking for 600 tons and a sewage project at Great Neck, N. Y., requires 200 tons.

Philadelphia—Merchant pipe business reflects some seasonal pickup. A pipe mill in this district is expected to resume partial operations this week after two weeks' shutdown.

Birmingham, Ala.—Awards have been maturing slowly and no necessity for increasing output is seen. NRA has modified the order it issued in June which established minimum base carload prices for soil pipe and fittings, provided that the delivered minimum net price for less carload shipments shall not exceed the carload price by more than 10 per cent.

Cast Pipe Placed

870 tons, 4, 6, 8 and 14-inch, Chehalis, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

400 tons, various sizes, Seymour, Wis., to James B. Clow & Sons, Chicago.

400 tons, 48-inch and under, cement lined with specials, Metropolitan District commission, Boston, to Warren Foundry & Pipe Co., Phillipsburg, N. J.

393 tons, 8-inch, Culbertson, Mont., to unnamed interest.

250 tons, various sizes, Grayling, Mich., to James B. Clow & Sons, Chicago.

209 tons, 4 to 8-inch, class 150, Fairview, Mont., to unnamed interest.

130 tons, Moab, Utah, to unnamed interest.

125 tons, 8-inch, Concord, N. H., to United States Pipe & Foundry Co., Burlington, N. J.

110 tons, 10-inch, Wilmington, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

Steel Pipe Placed

542 tons, comprising about 460 tons of carbon and 80 tons of alloy steel boiler tubes, to Pittsburgh Steel Co., Pittsburgh, for delivery to five navy department yards.

510 tons, large sizes, Washington, to Alco Products Co., New York, through Interstate Engineering Co., Baltimore.

Cast Pipe Pending

1040 tons, 2 to 24-inch, class 150, Phoenix, Ariz.; bids in.

380 tons, 30-inch outfall sewer, Los Angeles; F. W. Weber, South Gate, Calif., low.

600 tons, Chester, N. J.

476 tons, 6-inch, class 150, Williams, Ariz.; bids Sept. 17.

200 tons, sewage project, Great Neck, N. Y.

125 tons, 12-inch, Onset, Mass.; bids in.

Strip Steel

Strip Prices, Page 53

Pittsburgh—An improved market for hot strip continued last week and although orders still are small, they are more numerous. Slightly heavier tonnage is coming from the automotive industry and especially parts suppliers in the Toledo, O., district and at centers north of Detroit. The hot-rolled market is steady at 1.85c, Pittsburgh. In cold strip, at 2.60c, Pittsburgh and Cleveland, there has not been a proportionate improvement.

Cleveland—Mill operations continue intermittent, with light demand for strip. Mills in this district were idle last week, but expected to accumulate sufficient miscellaneous tonnages for some schedules this week. Prospects for automobile orders shortly are stronger, with negotiations now in progress between automobile manufacturers and partsmakers, and the actual placing of some substantial business for parts.

Chicago—While automotive requirements for steel strip gradually are declining, small gains occasionally are noted in orders from smaller consumers. Users are reluctant to make fourth quarter commitments.

Boston—Cold-rolled strip operations are sluggish, except in a few smaller plants producing specialties of narrow widths. In general demand for both hot and cold strip has increased only slightly. Prices are steady at 2.80c, Worcester.

Philadelphia—While there is little increase in actual tonnage, inquiry for strip appears more active and miscellaneous in character, indicating that consumers' stocks in many cases have reached the replenishment point. Hot-rolled strip is steady at 1.85c, Pittsburgh, or 2.14c, Philadelphia, and cold-rolled strip at 2.60c, Pittsburgh, or 2.89c, Philadelphia.

Tin Plate

Tin Plate Prices, Page 52

Pittsburgh—For the second consecutive week, operations in the tin plate industry advanced 5 points last week to 45 per cent. Even though tin plate orders from domestic canmakers are showing a downward trend, the volume of material for South America and the Orient has been of distinct benefit to Pittsburgh mills. The market is unchanged at $5.25 per base box, with tin mill sizes of black sheets quoted 2.75c, and long ternes named at 3.40c. A new type of alloy plate with a light terne coating is being introduced by several tin plate producers, for use in making oil cans.

New York—Some inquiry is appearing for fourth quarter on which tin plate manufacturers expect to close shortly.

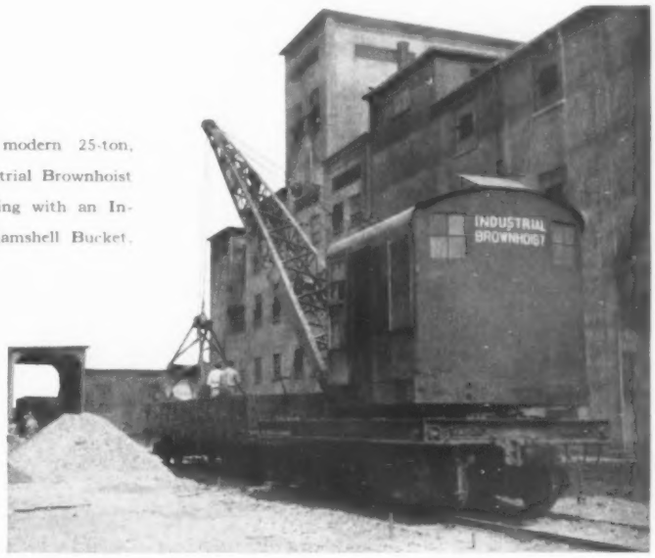
Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 53

Prices on bolts and nuts for fourth quarter delivery have not been announced and buyers have not pressed for quotations. Meanwhile 70 off list applies to the small business that appears. Large rivets have been reaffirmed for fourth quarter at 2.90c, Pittsburgh or Cleveland, and 3.00c, Chicago. Some concessions have been made to consumers in the Chicago district.

Forward buying is almost absent and current needs are confined to small, infrequent lots.

Illustration shows a modern 25-ton, gasoline-operated Industrial Brownhoist locomotive crane working with an Industrial Brownhoist Clamshell Bucket.



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General Offices: Bay City, Michigan
District Offices: New York, Philadelphia, Chicago, Cleveland

INDUSTRIAL BROWNHOIST

Shapes

Structural Shape Prices, Page 52

Pittsburgh—As soon as approval is given for erecting the 42-inch strip mill building for Carnegie Steel Co. at Youngstown, O., it is expected approximately 4000 to 5000 tons of structural shapes will be fabricated. The structural shape market is slightly more active and includes a fair proportion of private work. The market holds at 1.80c, Pittsburgh.

Cleveland—Award of 850 tons of shapes for the Toledo Y.M.C.A., and 450 tons for an Ohio state bridge in Coshocton county features the market. No new state projects have developed, and private building requirements are limited to small lots for alterations.

Chicago—Plans are out for the Trempealeau, Wis., dam involving about 3000 tons of plates and shapes, in addition to 1472 tons of piling, with bids closing Oct. 2. While dates have yet to be set for bids on four other Mississippi river dams, plans for this work are expected to appear soon. A bridge at Omaha involving 4000 tons of shapes again is active. Bids on the Ashland avenue bridge superstructure here will not be asked for until another month or two. Awards are small both individually and in the aggregate. For the *Chicago Tribune* radio building 500 tons have been placed.

Boston—Structural steel inquiry and awards are heavier. The largest inquiry is for the superstructure, parcel post building, Boston, 9000 tons. McClintic-Marshall Corp., Bethlehem, Pa., is low on the Saugus river, Lynn-Revere, Mass., bridge, 2500 tons.

New York—New inquiry for structural steel is lagging, but a fair volume of work is being figured, including the largest project in the district, the downtown federal building, New York. This will require nearly 15,000 tons, closing Oct. 2.

Philadelphia—A prospective inquiry for approximately 1000 tons of steel for a factory building at Edgemoor, Del., features structural developments here, with early award of 680 tons for a Pennsylvania railroad bridge expected. Approximately 500 tons for a high school at Reading, Pa., also are up for early placing. Shape prices are 1.90c, Bethlehem, Pa., or 2.00½c, Philadelphia.

Buffalo—Demand for structural steel is fairly active. Fabricators here are working at the best rate of the year.

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GARAGE IN CONNECTION

(AT CASS AND BAGLEY AVENUES)

DETROIT

Shape Contracts Placed

850 tons, building for Y. M. C. A., Toledo, O., to R. C. Mahon Co., Detroit.

643 tons, Licking river bridge, Newport, Ky., to R. C. Mahon Co., Detroit; 160 tons, piling, to Temple Foundation Co., Cincinnati.

575 tons, addition to Federal Reserve bank, New York, to Ingalls Iron Works Co., Verona, Pa.; through Marc Eidlitz & Son.

500 tons, radio towers for department

Shape Awards Compared

	Tons
Week ended Sept. 15	6,894
Week ended Sept. 8	7,639
Week ended Sept. 1	15,790
This week in 1933	11,893
Weekly average, 1933	9,296
Weekly average, 1934	16,620
Weekly average, August	15,774
Total to date, 1933	530,672
Total to date, 1934	631,569

of commerce, to Blaw-Knox Co., Blawnox, Pa.

500 tons, radio building, *Chicago Tribune*, Chicago, to unstated interest.

450 tons, state bridge, Coshocton county, Ohio, to Lackawanna Steel Construction Corp., Buffalo.

364 tons, power plant, Leadville, S. Dak., for Homestake Mining Co., to Worden-Allen Co., Milwaukee.

350 tons, bridge, Louisville & Nashville railroad, to Virginia Bridge & Iron Co., Roanoke, Va.

300 tons, Nebraska state highway bridges, to Omaha Steel Works, Omaha, Nebr.

270 tons, crusher plant at Whitehall, Md., for J. E. Baker Co., York, Pa., to Belmont Iron Works, Philadelphia.

250 tons, school, Milton, Mass., to New England Structural Co., Boston; Martin Ryan Co., Cambridge, Mass., general contractor.

220 tons, state bridge, Winter's Run, Md., through Interstate Equipment & Construction Co., Baltimore, to American Steel Engineering Co., Philadelphia.

205 tons, piers Nos. 38 and 40, San Francisco, to Pacific Coast Steel Corp., San Francisco.

200 tons, building, Louisville, to Jones & Laughlin Steel Corp., Pittsburgh.

170 tons, building, Bridgeport, Conn., for Leake & Nelson Co., to Bethlehem Fabricators Inc., Bethlehem, Pa.

157 tons, highway bridge, St. Tamany parish, Louisiana, to Jones & Laughlin Steel Corp., Pittsburgh.

125 tons, bridge, Ganada, Tex., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

125 tons, trestle, White Fuel Co., South Boston, Mass., to New England Structural Co., Boston.

125 tons, barking machine for Washington Pulp & Paper Co., Port Angeles, Wash., to Isaacson Iron Works, Seattle.

150 tons, bus garage, Trenton, N. J., for Trenton Transit Co., to McClintic-Marshall Corp., Bethlehem, Pa.

105 tons, church, Holyoke, Mas., to Haarmann Steel Co., Holyoke, Mass.

100 tons, high school gymnasium, Colton, Calif., to Kyle Steel Construction Co., Los Angeles.

100 tons, bridge, Chilton, Wis., to Vulcan Mfg. Co., Fond du Lac, Wis.

100 tons, building, Tobin Packing Co., Ft. Dodge, Iowa, to Des Moines Steel Co., Des Moines, Iowa.

100 tons, building state hospital, Tewksbury, Mass., to Haarmann Steel Co., Holyoke, Mass.

100 tons, Fernald state school, Massachusetts, to Grossier & Schlager, Boston.

Shape Contracts Pending

9000 tons, superstructure, parcel post building, Boston; bids Oct. 5, Washington.

5000 tons, Chevrolet assembly plant, Baltimore; steel contract to J. A. Utley, Detroit, with award of steel pending.

4500 tons, estimated, shapes, plates and bars, fourth quarter requirements, Norfolk & Western railroad; bids Sept. 26 to Clyde Cocke, purchasing agent, Roanoke, Va.

4000 tons, Farnum street bridge, Omaha, Nebr.

3000 tons, Mississippi river dam No. 6, Trempealeau, Wis., also 1472 tons of piling; bids to United States engineers, St. Paul, Oct. 2.

2500 tons, superstructure, bridge, Saugus river, Lynn-Revere, Mass., McClintic-Marshall Corp., Bethlehem, Pa., low at $540,907; bids Sept. 11.

1050 tons, surgical ward building, City hospital, Boston; Matthew Cummings Co., Boston, low.

1000 tons, approximately, plant for the Krebs Pigment & Color Co., Edgemoor, Del., subsidiary of E. I. Du Pont de Nemours Inc., Wilmington, Del.; specifications to be issued shortly.

900 tons, bridge, Merrimac river, Lawrence, Mass.; bids Sept. 25 to J. R. Worcester, Boston, engineer.

850 tons, piling, diversion dam, North Platte, Nebr.; Abel Construction Co. & Dobson, Lincoln, Nebr., low on general contract.

700 tons, school, Lawrence, N. Y.

680 tons, bridge for the Pennsylvania railroad at Elmira, N. Y.; award expected shortly through Sinclair & Griggs, Philadelphia, general contractors.

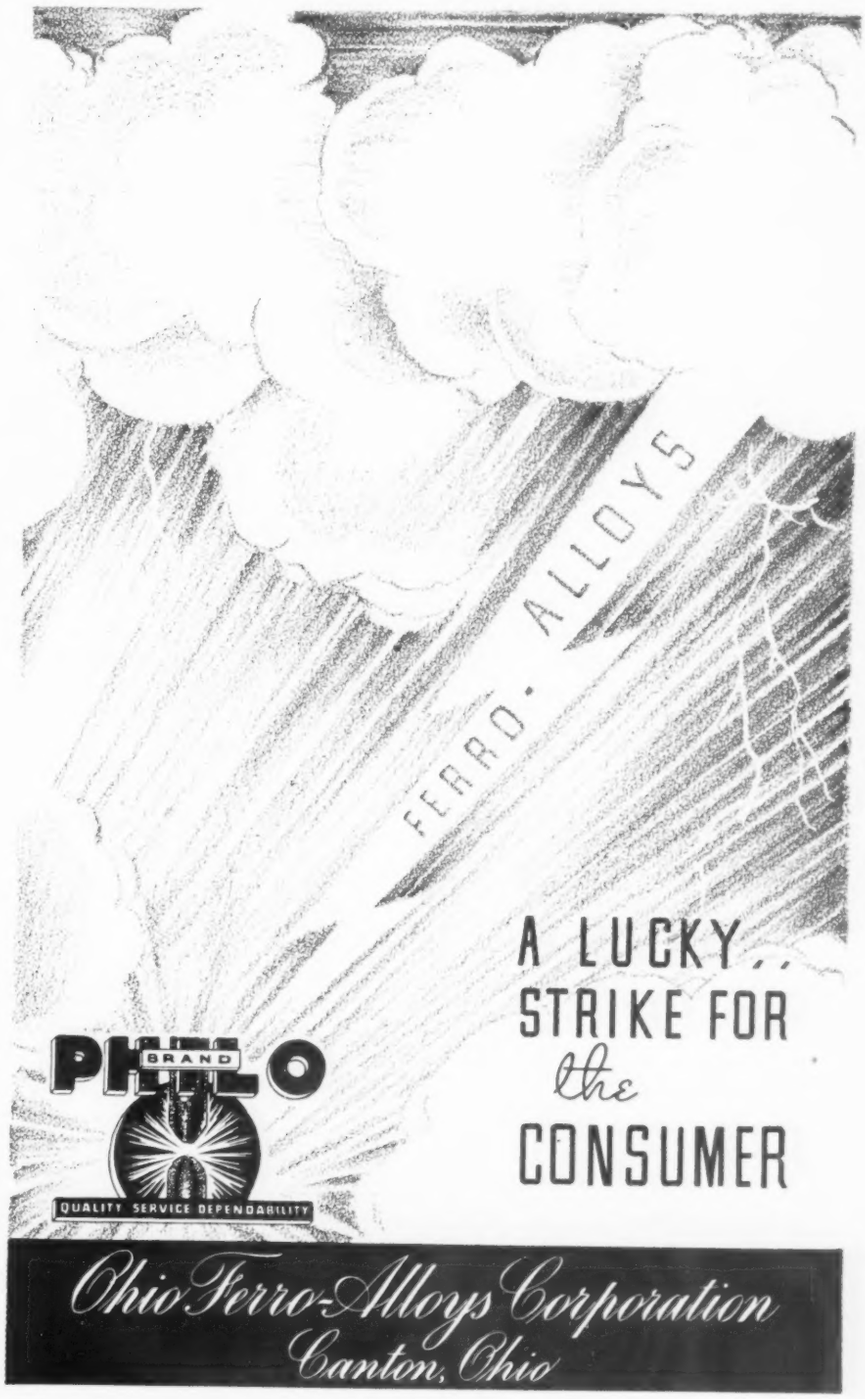
500 tons, high school, Reading, Pa.; McCloskey & Co., Philadelphia, low on general contract. Project also requires 500 tons of reinforcing bars.

400 tons, nurses' home, state hospital, Taunton, Mass.; Matthew Cummings Co., general contractor.

400 tons, aqueduct, Los Angeles; bids Oct. 3.

380 tons, state bridge work, Lackawanna county, Pennsylvania; bids Sept. 21, at Harrisburg.

300 tons, radio station, Lualualier, Oahu.



T. H.; E. E. Black, Honolulu, low on general contract.
300 tons, store, addition, A. J. Fox Co., Boston; revised bids in.
280 tons, bridge over Patunxent river, Hall Station, Maryland.
275 tons, building, McGill, Nev., for Nevada Consolidated Copper Co.
250 tons, hangar, France field, C. Z.; bids Sept. 26.
250 tons, Robinson building, Memorial hospital, Boston; John Bowen Co., Boston, low.
250 tons, bridge, Cambridge street, Worcester, Mass.; Coleman Bros. Corp., Boston, low at $100,307; bids Sept. 11.
246 tons, bridge and highway approaches, route 30, section 8A, Hampton, N. J.; bids Oct. 1. Project also takes approximately 65 tons of bars and mesh.
237 tons, piling for Pine dam project, Utah; Utah Construction Co., Ogden, Utah, and Morrison-Knudsen Co., Boise, Idaho, low joint bid.
224 tons, state bridge in Sanders county, Montana; bids opened.
220 tons, Barnham boulevard bridge for Los Angeles county, California; bids opened.
200 tons, Meadow Gold Co., dairy building, Pittsburgh.
190 tons, state bridges, Vermont; bids in.
175 tons, powerhouse for Washington State college Pullman, Wash.; Ross B. Hammond, Portland, Oreg., low.
165 tons, state bridge over Catoctin creek, Middletown, Md.
150 tons, utility building, Yosemite, Calif.; Golden Gate Iron Works, San Francisco, Calif., low.
150 tons, Edison highway bridge, Baltimore.
150 tons, garage Eastern Massachusetts street railway, Lynn, Mass.
133 tons, state bridge in El Paso county, Colorado; bids opened.
120 tons, dormitory, soldiers' home, Chelsea, Mass., John Bowen Co., Boston, low.
125 tons, addition, Federal Loan bank, Springfield, Mass.
100 tons, addition, Belmont hospital, Worcester, Mass.
100 tons, high school and community building, Minneapolis.
100 tons, approximately, Pennsylvania state road work, including 85 tons for bridge at West Overbrook, on which bids were opened Sept. 14.

Wire

Wire Prices, Page 53

Pittsburgh—No improvement has occurred in merchant or manufacturing wire products, and hand-to-mouth buying characterizes the small infrequent orders which distributors and other buyers place. Contract to furnish 380 feet of wire rope for the Pittsburgh federal engineers has been awarded to A. Leschen & Sons, St. Louis, on a bid of $1009.

Cleveland—Specifications for wire and wire products during the week were nearly twice those of the preceding week, though still at a low ebb. Some substantial sales of wire rods were booked here. Due to sharp competition on wire and nails by mail order houses and others who sell direct to consumers leading jobbers are refusing to sign agreements with mills not to sell below mill prices

Chicago—Wire demand continues to show a slight gain over a month ago. While automotive needs are declining, occasional gains are noted in requirements of other consumers of manufacturers' wire.

Boston—Wire demand improves slowly, but with some spotty gains, as consumers' stocks have been gradually lowered. Textile wires are dull. Manufacturers' wire is unchanged at 2.40c, Worcester. Finishing operations are still light.

Cold Finished

Cold Finished Prices, Page 53

Pittsburgh—A slight increase in cold-finished steel bar specifications featured the market last week. Buying was mainly from miscellaneous manufacturing sources, and failed to include automotive tonnage, other than in small lots. No deviation from the 2.10c, base Pittsburgh, on cold-drawn carbon bars is reported.

Semifinished

Semifinished Prices, Page 53

Several heavier orders for sheet bars, one grouping of which enabled a Pittsburgh district open-hearth department to step up its rate of operations last week, featured a slightly better trend in semifinished steel specifications. The market for wire rods, skelp and billets is dull. Billets are $27, sheet bars, $28 and wire rods, $38, Pittsburgh.

It is reported that the appeal for establishment of an eastern basing point on carbon steel billets has been rejected by the American Iron and Steel institute.

Coke By-Products

Coke By-Product Prices, Page 53

New York—Low output of distillates is notably apparent in xylol, with some distributors reporting a shortage of the latter. Demand for other distillates also is active, with prices firm and unchanged. Naphthalene shipments are slightly better. Sulphate of ammonia covering has been active.

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WE WIN WITH QUALITY

Reinforcing

Reinforcing Bar Prices, Page 53

Cleveland — General contractor bids will be taken some time between Oct. 15 and Nov. 1 on three dams for the Muskingum, Ohio, watershed conservancy district, a $34,000,000 federal-aid project. Ultimately 12 dams will be constructed. The first three will require several thousand tons of steel, mainly reinforcing bars. A considerable tonnage of bars also will be required for the Cleveland housing project, toward which the government has contributed $500,000. While the steel has not been estimated, 790 houses are to be built, mainly concrete and brick. Currently, the market is quiet. Hawthornden Farm, Northfield, O., a state institution will take bids this month on 150 tons for dormitories. A few small municipal projects were placed during the week.

Los Angeles—Two of the largest concrete bar tonnages to come out in this district in several years will be up for bids shortly. Leading, is 38,000 tons, including 24,000 tons of rail steel bars, for an aqueduct in the Los Angeles metropolitan water district, on which bids will be taken Oct. 3. This project also includes 10,000 tons of plates. The district board also will take bids on 18,000 tons of bars for special work, although the date has not been set.

Pittsburgh—Highway lettings in West Virginia and Pennsylvania continued to feature the reinforcing steel bar market. West Virginia closes Sept. 8 on 20 projects, and for the eighth consecutive week, a Pennsylvania state letting was announced last week for closing at Harrisburg, Pa., Sept. 28. Miscellaneous tonnages of plain steel bars, mesh and other reinforcing materials are involved. The market remains quoted 2.05c, base Pittsburgh, on cut lengths in carload lots.

Chicago—Some general contracts for Illinois road work included in a recent letting have been placed and bar orders totaling more than 1000 tons will be distributed soon. A few private projects are included in orders and inquiries, awards involving 300 tons for a grain elevator at Battle Creek, Mich., and 150 tons for an office building here. A steel plant building will take 216 tons.

New York—Reinforcing bars and highway mesh lettings are holding to the recent fair rate with inquiry slightly heavier, led by an estimated 2000 tons for foundations for the downtown federal building, New York, and close to 1100 tons for the Bronx market.

Boston—Small-lot buying of reinforcing bars is active. Inquiry is heavier, notably for building construction, although the bulk of demand is still for bridges and highways.

Philadelphia — Although reinforcing bar buying last week was confined to small miscellaneous lots, more than 650 tons are active for two

Concrete Awards Compared

	Tons
Week ended Sept. 15	2,675
Week ended Sept. 8	1,300
Week ended Sept. 1	3,815
This week in 1933	2,720
Weekly average for 1933	3,232
Weekly average, 1934	4,754
Weekly average, August	6,834
Total to date, 1933	132,006
Total to date, 1934	180,681

The material problems of many users of cold strip have been solved by the specification of Thomastrip . . . Specific requirements are better served by the adequate equipment and concentrated attention of Thomas specialized cold strip production. For example, uniformity of temper is assured by the precision control of Thomas annealing and rolling operations. Special processes avoid discoloration and grain growth . . . Put your problems up to Thomas. You will find many advantages in Thomas service.

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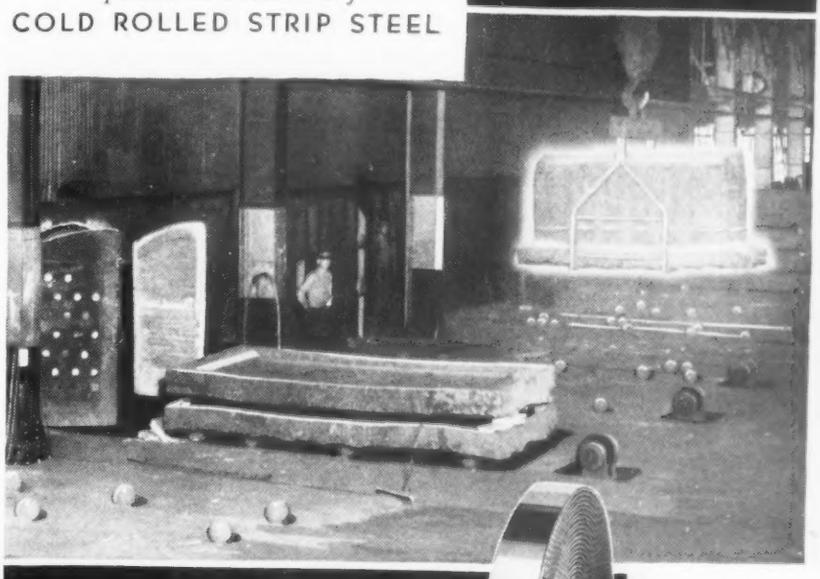

THOMASTRIP
STRIP (COLD ROLLED) STEEL
BRIGHT FINISH • ZINC COATED
COPPER COATED • CADMIUM COATED

schools in Reading, Pa. Billet steel bars, cut lengths, are 2.05c, Pittsburgh, or 2.34c, delivered, Philadelphia.

Reinforcing Steel Awards

400 tons, federal land bank, Columbia, S. C., to Virginia Steel Co., Richmond, Va.; J. C. Heslep, Columbia, S. C., general contractor.

300 tons, mesh, highway, Oneida and Lewis counties, New York, to American Steel & Wire Co., New York; through Law Bros. Contracting Corp.

300 tons, grain elevator, Battle Creek, Mich., to Inland Steel Co., Chicago.

250 tons, alterations, Garfield school, Los Angeles, to unnamed interest.

250 tons, inspection shed, board of transportation, Jamaica, N. Y., to Joseph T. Ryerson & Son Inc., New York; through William Kennedy Construction Co.

200 tons, school alteration, Long Beach, Calif., to unnamed interest.

200 tons, reservoir, Fallon, Nev., to unnamed interest.

175 tons, mesh, highway, Onondaga county, New York, to American Steel & Wire Co., New York; through John Bellardine.

150 tons, shop and office building, Monroe and Dearborn streets, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

150 tons, mausoleum, Calvary cemetery, Los Angeles, to unnamed interest.

100 tons, mesh, highway, Fulton county, New York, to American Steel & Wire Co., New York; through Utica Construction Co. Inc.

100 tons, high school alterations, Torrance, Calif., to unnamed interest.

100 tons, Russell school alterations, Los Angeles, to unnamed interest.

Reinforcing Steel Pending

38,000 tons, including 24,000 tons of rail steel bars, aqueduct, Los Angeles; bids Oct. 3.

18,000 tons, special work for metropolitan water district, Los Angeles; bids soon.

2000 tons, foundation, downtown postoffice, New York; bids Oct. 2.

600 tons, California Fruit Growers Exchange building, Los Angeles; bids soon.

500 tons, high school, Reading, Pa., McClosky & Co., Philadelphia, low on general contract; approximately 500 tons of structurals also required.

350 to 400 tons, miscellaneous road work for state of Pennsylvania; bids to be opened Sept. 28, Harrisburg, Pa.

300 tons, dam No. 6, Trempealeau, Wis.; bids to United States engineer, St. Paul, Oct. 2.

216 tons, building, Acme Steel Co., Riverdale, Ill.

210 tons, radio station, Pearl Harbor, T. H.; E. E. Black, Honolulu, low on general contract.

165 tons, grade school, Reading, Pa.; Consolidated Engineering Co., Baltimore, awarded general contract.

150 tons, chapel for St. Paul's cathedral, Los Angeles; bids being taken.

150 tons, dormitories, Hawthornden Farms, state institution, Northfield, O.

130 tons, infirmary building, Waltham, Mass.; Matthew Cummings Co., Boston, low. Project also takes 50 tons of structurals.

100 tons, hospital ward for Tulare county, Visalia, Calif.; bids opened.

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Pig Iron

Pig Iron Prices, Page 54

Pittsburgh—A few small stove foundries in this district appear to have fair schedules, but are buying iron in only two, three, and four-ton lots at a time; in fact purchases are so small they are being trucked to delivery. The local market, quoted on the basis of $18.50 per ton for foundry, $18 for basic and $19 for bessemer grades, holds unchanged.

Cleveland—New orders and shipments are limited to carload lots, but the number increased slightly. A few of the consignments went to automobile foundries, but real improvement in that direction is lacking. Stove and range manufacturers have purchased more liberally. Freight rate advances are not anticipated before the end of the year by pig iron producers.

Chicago—New pig iron orders so far this month have shown a small gain compared with August, while shipments have shown little change. Orders usually involve only small lots and fairly large stocks of some consumers still have a restricting effect on new business. Specifications of automotive foundries have been reduced materially during recent weeks and little improvement is expected prior to start of new model production. Farm implement manufacturers have yet to increase operations to any marked extent while tractor builders still experience fairly good schedules. Few fourth quarter pig iron contracts have been signed, with the market continuing $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron sales are limited to a few scattered carloads with no substantial inquiry out. The textile strike has had a depressing influence on foundries producing equipment for mills. While fourth quarter prices are unchanged, there has been practically no advance buying and most large consumers have substantial stocks of iron.

New York—Pig iron business is the best since June with two or three fair-size orders, as well as a slight improvement in number of small purchases.

Philadelphia—Pig iron business continues to be comprised largely of

scattered carlots. The largest purchase reported involves 200 tons of foundry iron for the Philadelphia navy yard, placed with a southern producer.

Pipemakers have heavy stocks, with one leading producer having almost two years supply at the present rate of operation and another having at least several months' supply currently on hand.

Buffalo—Pig iron purchases are in small lots and only for immediate shipment. The announcement of continuation of present prices through the fourth quarter created little interest among consumers and failed to bring anticipated buying.

Cincinnati—Sales of pig iron continue restricted to small lots. The melt, although light, exceeds shipments.

St. Louis—Lacking the incentives of possible price advance and better business prospects, users of pig iron are almost entirely out of the market. Most important melters are amply provided with iron, and the lesser interests, some with stocks unusually low, are content to purchase small quantities as needs arise. Producers and distributors report an utter lack of interest in fourth quarter iron. Major portion of the current melt is being accounted for by manufacturers of stoves and heating apparatus. Jobbing foundries continue to operate on reduced schedules.

Birmingham, Ala.—Sales of pig iron are fewer and still in small lots. Production has been reduced to half what it was 60 or 90 days ago. Two more blast furnaces are slated to go out during this month. Five are now in blast, including one of the larger stacks of the Tennessee Coal, Iron & Railroad Co., at Fairfield.

Toronto, Ont.—New developments are absent from the Canadian iron market, but some large contracts are reported pending. Merchant pig iron demand is marking time with current sales in single car lots. Daily melt is unchanged and production is holding around 36,000 tons per month. Prices are steady and unchanged.

Scrap

Scrap Prices, Page 55

Pittsburgh—Scheduling of heavier open-hearth operations enliven prospects in the scrap market. Aside from closing on railroad lists, such as the Pennsylvania, which brought around $10.75 for delivery in this district, there has been little to gage the nominal markets on No. 1 heavy melting and other open hearth grades. However, owing to a $7 purchase of machine shop turnings, this market has weakened 50 cents per ton, and because of a totally absent demand, blast furnace borings and turnings are also off.

Cleveland—Small, irregular shipments of scrap continue to go forward on contracts but there is no buying of importance and the market is lifeless. Prices of railroad grades have softened and some reductions of 25 cents to $1 have been made.

Chicago—Heavy melting steel has dropped another 25 cents to $8.25 to $8.75, a new low level for the year. Mills defer extensive buying pending indications of an improvement in steelmaking operations and shipments against orders are restricted. Offerings of distress scrap are light, but moderate tonnages continue to be disposed of regularly by railroads. Such material still commands a premium over regular industrial scrap.

Philadelphia—Further weakness is noted in scrap, several grades being reduced, with the outlook for new buying still unsettled. No. 1 heavy melting steel is easier at $9.50 to $9.75, delivered, with the leading Claymont, Del., consumer having recently purchased an additional tonnage at $9.75, or 25 cents under his previous purchase late in August. The situation in this grade is further depressed by reports of additional reductions in the Pittsburgh district.

New York—Except for a steady volume of buying for export at unchanged prices, scrap demand is dull. Prices on numerous grades are nominal. Dealers continue to pay $8, barge, for No. 1 melting steel for export and $6.50 for No. 2.

Boston—Scrap demand is dull as domestic consumers take light shipments with new export buying slow. Heavy melting steel for domestic shipment is inclined to be easy with some dealers offering 25 cents a ton less. Scrap rails are also off 25 cents a ton.

Buffalo—A medium tonnage of No. 2 heavy melting steel has been sold for local delivery at a price reported to be $8.75. This is the first confirmation of nominal prices quoted here throughout the quarter. Aside from this deal the market is dormant.

Detroit—No. 1 heavy melting steel and compressed sheets hold steady at $7.75 and $8.25. Some stocking of hydraulic compressed sheets at around $8 a ton is being done by a

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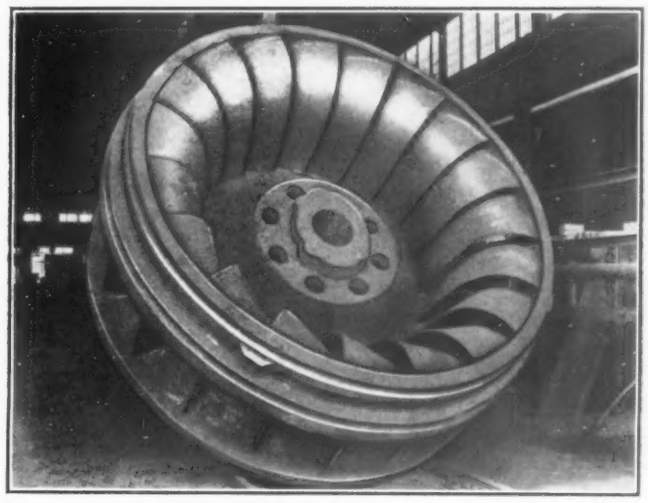

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local interest, but the market generally shows no feature.

Cincinnati—Absence of important iron and steel scrap buying is prolonged. Mills have not reduced stocks of scrap in the present quarter as rapidly as dealers anticipated and refuse to enter new commitments. Prices are nominal and weak, but the market is free of distress material.

St. Louis—Dealers report inquiries for iron and steel scrap at the lowest ebb in recent months and actual sales practically negligible. The recent downturn in prices and paucity of demand from industries has virtually dried up forwarding of country scrap. Advances of $1 per ton or more will be required to revive this movement.

Birmingham, Ala.—Trading in steel and iron scrap is at a standstill, with only occasional small sales of heavy melting steel. Dealers have sufficient stock for all needs.

Toronto, Ont.—Trading in iron and steel scrap is spotty and dull. Consumers are taking only small lots. Steel grades have fallen into a slump and only odd lot shipments are being made to the Hamilton mills. Iron grades, however, show some activity of a specialized nature.

Metallurgical Coke

Coke Prices, Page 53

Foundry and furnace coke users still are restricting purchases and aside from heavy production continuing in the Pittsburgh beehive coke district on export orders, the market is featureless. Fair stability of prices is noted on the basis of $3.60 for Connellsville oven furnace coke contracts, with $3.85 quoted for spot shipment. Foundry coke ranges between $4.60 and either $5.10 or $5.35 per ton, depending upon the grade.

Shipments of by-product coke at Chicago are holding gains made in August. Prices have not been changed. St. Louis coke buying is slightly under the August rate with domestic grades at 25 cents advance moving more freely. Cincinnati specifications are close to the August rate. Independent producers at Birmingham, Ala., find demand somewhat better.

Ferroalloys

Ferroalloy Prices, Page 54

While nothing official is available, the leading domestic producer of spiegeleisen is expected to open its books shortly for fourth quarter at unchanged prices. The current market on 19 to 21 per cent material is $26, furnace, on quantities up to 50 tons, and $24 on 50 tons and over. Ferromanganese producers opened their books Sept. 1, at the unchanged price of $85, duty paid, Atlantic and Gulf ports. Prices on both these products have been unchanged since the first of the year, although with a further increase in manganese ore of 2 cents a unit, just announced, ferromanganese sellers believe that an advance for the first quarter of next year is inevitable. Specifications for both spiegeleisen and ferromanganese remain light.

Iron Ore

Iron Ore Prices, Page 54

New York—Foreign manganese ore has been advanced 2 cents per unit, with Caucasian, 52-55 per cent, and South African, 52 per cent, now holding at 26 cents a unit, c.i.f. Atlantic ports. South African manganese, 49-51 per cent, has been increased similarly to 24 cents. This increase reflects primarily a continuation of substantial demand abroad and represents, insofar as business on this side is concerned, simply a change in the asking prices, with the Caucasian producer taking the lead. As most American consumers still are covered by old contracts, it may be some time until new prices are tested.

Other foreign ores appear nominally unchanged, with importations at the moment light.

Cleveland—Iron ore stocks on Lake Erie ports Sept. 1 were only 39,710 tons less than at the comparable time last year, according to the Lake Superior Iron Ore association. Receipts at these ports and shipments therefrom for the season to Sept. 1, with dock balances follow:

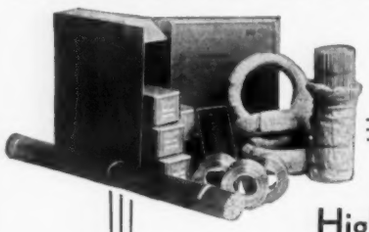
	Receipts	Shipments	Dock. bal. Sept. 1, 1934
Buffalo	1,144,332	5,442	2,153
Erie	670,530	677,177	121,163
Conneaut	2,193,674	2,397,273	1,663,694
Ashtabula	1,360,711	1,332,457	1,529,556
Fairport	646,320	651,132	387,403
Cleveland	2,889,026	1,896,942	755,543
Lorain	1,255,253	729,702	12,527
Huron	336,230	299,622	374,369
Toledo	543,125	290,711	9,406
Total	11,039,201	8,280,458	4,855,814
Year ago	7,753,731	6,069,779	4,895,524

Receipts for the season at other ports:

	Tons
Detroit	424,542
Indiana Harbor	910,602
Gary	1,126,832
South Chicago	1,377,082
Sault Ste. Marie, Ont.	11,223
Hamilton, Ont.	220,535
Total	4,070,816
Comparative, 1 year ago	2,372,016

Quicksilver

New York—Quicksilver prices are generally unchanged with the market only lightly active. Small lots are $75, a virgin flask of 76 pounds, and recent sales of round lots have been noted down to $74 a flask.



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Warehouse

Warehouse Prices, Page 56

Pittsburgh—A slight improvement in warehouse steel shipments in this district occurred last week, placing the month to date slightly ahead of the same period in August. Prices are unchanged and generally steady.

Cleveland—Warehouse interests have analyzed the new mill quantity extras to go in effect Oct. 1, and find their prices generally will still be 50 to 75 cents per 100 pounds above the mill levels, though there are a few exceptions. The overall effect is expected to be moderately in favor of the warehouses. Business continues in light volume.

Chicago—Sales from warehouse have shown little change this month although some betterment in orders resulted after the holiday shutdown. Prices are unchanged.

Boston—Warehouse stocks are being gradually reduced, notably the more active products and some jobbers are buying moderately for replacement. Jobbers' volume is slightly heavier.

New York—Warehouse volume is below expectations thus far this month. Prices are unchanged and steady on most products.

Philadelphia—Steel warehouses find little change in volume of buying and prices are steady.

Detroit—Seasonal improvement usual at this time in warehouse trade puts September ahead of first half of July and August. Steel is going largely to motor plant rehabilitation. There is no change in prices.

Cincinnati—Demand for steel from warehouse has been well sustained this month, without enough change from the volume of August business to determine the autumn trend. Prices are unchanged.

St. Louis—The past week or ten days have developed no change worthy of note in business of iron and steel warehousemen and jobbers. Orders are for small quantities.

Steel in Europe

Foreign Steel Prices, Page 56

London—*(By Cable)*—Production of pig iron and steel in Great Britain fell off in August. Pig iron output was 503,300 gross tons, compared with 527,200 tons in July, a loss of 23,900 tons. Active furnaces numbered 97 compared with 99 in July. Steel ingot production totaled 667,000 tons, compared with 718,200 tons in July, a decline of 51,200 tons.

British steel and iron markets are expanding, including export trade. Domestic prices are firm. The Midland district is especially active in structurals. A contract for 1,000,000 pounds of steel for dam work in the Near East has been booked.

Domestic sheet trade is improving and tin plate trade is active. The Continent reports markets are quieter following recent activities in the Far East. British buying from continental suppliers is increasing. Berlin reports export trade active to the Far East, India and South America.

Pacific Coast

Pacific Coast Prices, Page 53, 54, 55

San Francisco—*(By Air Mail)*—Among pending steel tonnages are 38,000 tons of reinforcing bars and 10,000 tons of plates for an aqueduct in Los Angeles for the metropolitan water district, up for bids Oct. 3. Specifications call for 24,000 tons of rail steel bars and 14,000 tons of new billet bars. Later 18,000 tons additional will be needed.

Colorado Fuel & Iron Co. booked 660 tons of rails for the relocation of the Spokane, Portland & Seattle railroad near the Bonneville dam in Oregon. Pacific Coast Steel Corp. took 124 tons of 128-pound girder rails for a wharf at Stockton, Calif. No award has been made on 471 tons of 9- to 128-pound rails for the Los Angeles harbor commission.

Unnamed interests obtained 250 tons and 200 tons of reinforcing bars for school alterations in Los Angeles and Long Beach, Calif., respectively. A reservoir at Fallon, Nev., involving 200 tons, went to unnamed interests. New inquiries include 600 tons for a fruit exchange building in Los Angeles. E. E. Black, Honolulu, T. H., is low bidder on a radio station calling for 210 tons of bars and 300 tons of shapes, at Lualualie, Oahu, T. H.

Babcock & Wilcox Co. was low on a 60 to 72-inch penstock for the Pine View dam near Ogden, Utah. Bids have been taken on 300 tons of plates for 11-foot pipe for Magic dam, Magic, Idaho. Standard Oil Co.'s inquiry for 5000 tons for twelve 134,000-barrel tanks is still pending. This company also plans additional tankage at Richmond, Calif., involving 1500 tons of plates.

Pacific Coast Steel Corp. secured 205 tons of shapes for piers No. 38 and 40, San Francisco, and Kyle Steel Construction Co. took 100 tons for a school gymnasium at Colton, Calif. Bids have been taken on 224 tons for a bridge in Sanders county, Montana, and on 220 tons for a bridge in Los Angeles county, Calif. Golden Gate Iron Works is low on 150 tons for a building in the Yosemite National Park, Calif. New inquiries include 400 tons for an aqueduct in Los Angeles and 250 tons for a hangar at France Field, C. Z.

Unnamed interests were awarded 393 tons and 209 tons, respectively,

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for Culbertson and Fairview, Mont., and 130 tons for Moab, Utah. Phoenix, Ariz., has opened bids on 1040 tons and Williams, Ariz., will open bids Sept. 17 for 476 tons.

Await Coulee Dam Bids

Seattle—(*By Air Mail*)—While steel interests are awaiting a call for bids for the 30,000 tons of materials required for the Coulee dam project, Frank A. Banks, chief engineer of the reclamation service, has announced that the department has selected a site at Coulee on which a steel fabricating plant will be erected by the government. The reason given is that it will be impossible to transport the fabricated units of the penstock, monolith and other sections, so forming and welding of plates must be done on the job. Fifty men will be employed and a branch railroad will be constructed.

Ross B. Hammond, Portland, Oreg., is low at $108,279 for the 60 x 100-foot powerhouse for Washington State college, Pullman, Wash., involving 175 tons of shapes. H. H. Langdon, engineer, is preparing plans and specifications for $100,000 of mechanical equipment for this plant, bids soon. Utah Construction Co., Ogden, Utah, and Morrison & Knudsen, Boise, Idaho, submitted the low bid of $677,898 for the Pine dam, Utah, project, calling for 237 tons of steel sheet piling.

Contract to furnish 870 tons of 4, 6, 8 and 14-inch cast iron pipe for Chehalis, Wash., has been awarded to United States Pipe & Foundry Co., Burlington, N. J. Several Oregon municipalities are planning water projects under federal aid, including a 6,000,000-gallon reservior at Corvallis, Oreg., a 6-inch main for the port of Portland airport and improvements at Milwaukee, Bend, Estacada and Monmouth, Oreg. Threet Bros. Construction Co., Lovell, Wyo., is low at $136,373 for the Big Timber, Mont., water system project, involving 30,000 feet of 14-inch main line and 27,000 feet of 6 to 12-inch distributing mains.

Prices are firm and well maintained although new projects are few and some branches of the steel industry are short of orders.

The jobbing business is less active than a month ago. Japan shows more interest in scrap steel and is placing new orders. Supplies are not coming in freely. Old commitments, held up by the waterfront strike, have been practically cleaned up. Vancouver, B. C., reports an active export scrap demand.

Nonferrous Metals

Nonferrous Metal Prices, Page 54, 55

New York—Easiness in zinc was the outstanding feature of the nonferrous metal market last week. Foreign copper and tin also weakened toward the end. Trading continued sluggish.

Copper—Domestic sales were less than 100 tons on most days, but on Wednesday increased to 671 of which less than 200 tons went to actual consumers. Prices held unchanged on the basis of 9.00c, Conn., for electrolytic blue eagle. Export copper slipped to a range of 6.85c to 6.87½c, c.i.f. European ports.

Zinc—After declining $1 a ton on Thursday, a further decline of $2 was recorded Friday with prices quoted on the basis of 4.00c, East St. Louis. Tri-State ore prices were expected to drop from $2 to $3 a ton at the end of the week, according to some estimates. The metal price cut failed to stimulate sales materially with some observers believing that buyers are waiting future developments to determine if the market is now at bottom.

Lead—Business has slipped off to light carlot buying with prices holding steady in range of 3.55c to 3.60c, East St. Louis, and 3.70c to 3.75c, New York.

Tin—Straits spot has been scarce with price quoted above levels for futures. Market was stronger as the week advanced, but was easier on Friday at 51.40c. Trading was light despite the fact that tin plate operations are holding fairly well to recent levels.

Antimony—Prices have strengthened on reports of higher quotations in China. A range of 8.75c to 9.00c, duty paid, was quoted toward the end of the week.

Aluminum—Remained unchanged in a quiet market.

Convention Calendar

Sept. 18-20—Association of Iron and Steel Electrical Engineers. Annual convention and exposition at Hotel Statler, Cleveland. John F. Kelly, Empire building, Pittsburgh, is secretary.

Sept. 20-22—National Industrial Advertisers association. Annual convention at Hotel Netherland Plaza, Cincinnati. Allan Beach, Littleford Bros. Co., Cincinnati, is secretary.

Sept. 26-28—Associated Machine Tool Dealers. Annual meeting in Chicago. Harry Barney, Barney Machinery Co., Koppers building, Pittsburgh, is secretary.

Sept. 27-29—Electrochemical society. Sixty-sixth convention at Hotel Pennsylvania, New York. Dr. Colin G. Fink, Columbia university, New York, is secretary.

Oct. 1-5—National Safety council. Twenty-third annual safety congress at Hotel Cleveland, Cleveland. W. H. Cameron, 20 North Wacker drive, Chicago, is secretary.

Oct. 1-5—American Society for Metals. Sixteenth National Metal congress at Hotel Pennsylvania, New York. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is secretary.

Oct. 1-5—Sixteenth National Metal exposition. Port Authority building, New York. W. H. Eisenman.

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7016 Euclid avenue, Cleveland, is manager.

Oct. 1-5—Wire association. Annual meeting at Hotel New Yorker, New York. Richard E. Brown, 17 East Forty-second street, New York, is secretary.

Oct. 1-5—American Welding society. Fourteenth fall meeting at Hotel New Yorker, New York. M. M. Kelly, 33 West Thirty-ninth street, New York, is secretary.

Oct. 1-5—American Institute of Mining and Metallurgical Engineers. Fall meetings of Institute of Metals and Iron and Steel divisions at Hotel Pennsylvania, New York. John T. Breunich, 29 West Thirty-ninth street, New York, is assistant secretary.

Mirrors of Motordom

(*Concluded from Page* 17)

back of the automobile industry has been remarkable. Up to Labor day approximately 2,325,000 cars have been made. Assuming for each a value of $850 to $900 the total is approximately $2,000,000,000, which in these times sounds more like the national debt or a new list of federal expenditures rather than the value of the product of any industry.

Scattered releases of material for parts not subject to styling are commencing to come out, constituting the first placement of steel for production purposes for 1935 models. The lots placed thus far have not been large, but make a start.

These parts are for steering gears, axles, springs, and in some cases, motors. Banks of such parts are usually built up about 60 days prior to a start on assembly of the new models and always precede the placement of steel for bodies, deferred as long as possible for decision on style.

Inspect Corporation Bridge

Bridge engineers from 26 leading railroads and executives of Carnegie Steel Co., Illinois Steel Co. and American Bridge Co. recently inspected an unusual type of bridge deck and track construction on the Allegheny river bridge of the Bessemer & Lake Erie railroad near Pittsburgh.

Liquidates Large Plants

McCabe & Sheeran Machinery Corp., 50 Church street, New York, is placing on the market the complete equipment of two large plants at Cincinnati and Holyoke, Mass. Involved are more than 2000 items which are described and to some extent illustrated in a special catalog prepared by this company. The equipment offered includes lathes, boring mills, planers, milling machines, drilling machines, grinders, shapers, hammers, pipe machines, saws, blowers and fans, furnaces, foundry equipment, woodworking machinery, motors, hoists and cranes.

Equipment

Pittsburgh—With recommendations now completed on the Carnegie Steel Co.'s 42-inch strip mill for Youngstown, O. it is expected that the awarding of contracts probably will take place within the next few weeks or at least as soon as approval has been given by executive headquarters of the United States Steel Corp. Republic Steel Corp.'s inquiry for a strip mill has been reported as possibly a 54 to 60-inch mill; likely the mill will be a 60-icnh hot-strip mill capable of rolling 54 inches wide. Widespread reports that this rolling unit would be a 100-inch mill are generally discredited in the steel mill equipment trade. With ingot rolling schedules still down to a minimum in this district, buying of rolls is in poor volume.

Chicago—Signs of a definite revival in equipment and machinery markets are lacking and both sales and inquiries continue slow despite a slight gain in the latter during the past week. Activity in small tools has improved moderately so far this month but users are hesitant to make major commitments for larger equipment. The betterment in small tool demand is taken as an indication of current or prospective betterment in metalworking operations. Railroads continue to be poor customers while few inquiries are pending for steel plants. Illinois Steel Co. has placed some orders for parts required for the revamping of a strip mill at its Gary, Ind., plant, as reported here two weeks ago.

Boston—A Worcester, Mass., machine builder has booked a substantial order for the navy, but inquiry and buying, except for the navy, is light. The textile strike has had an adverse influence, especially in the Worcester and Rhode Island districts. A navy list, closing Sept. 21, for Newport, R. I., includes eight horizontal milling machines, two spline milling machines, a surface grinder, a group of shaft turning lathes, three two-spindle drilling machines and three automatic screw machines.

New York—New inquiry for machine tools is slower. Contracts on several hundred tools for the Bronx vocational school are expected to be placed in about a week, but bids on a large list for the Brooklyn technical school have been postponed until awards on the former have been made. A growing list of large tools for the navy is coming out and bids are in on considerable equipment for delivery at the Washington navy yard.

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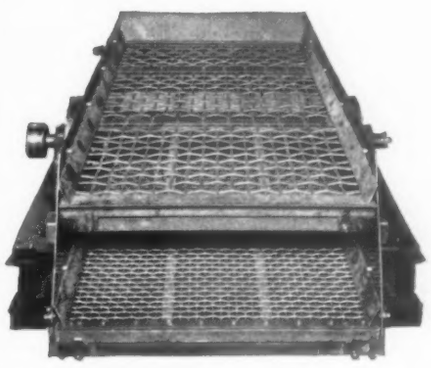

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Construction and Enterprise

New York

ELMIRA, N. Y.—Standard Oil Co. of New York, 26 Broadway, New York, will build a bulk storage plant at Elmira, to cost about $60,000, including tanks, pumps and other equipment.

HONEOYE, N. Y.—Village has voted to construct a sewage disposal plant and system, to cost about $175,000. W. S. Lozier Inc., 10 Gibbs street, Rochester, N. Y., is engineer.

NEW YORK—American Brakelock Corp., 230 Park avenue, subsidiary of American Brake Shoe & Foundry Co., will build a 2-story addition to its plant at 4660 Merritt avenue, Detroit, at cost of about $45,000.

NEW YORK — Fletcher Machinery Corp. has been incorporated to manufacture machinery and tools, by Joseph Montgomery, 571 Dewey avenue, Grantwood, N. J., George H. Halbert, 395 Bard avenue, West New Brighton, N. Y., and Peter Wilchin, 144 North Fifth street, Brooklyn, N. Y.; filed by Alfred W. Kiddle, 511 Fifth avenue, New York.

ROCKVILLE CENTER, L. I.—Department of public utilities plans construction of an addition to the municipal electric light and power plant, to cost about $260,000 for building and equipment, for which financing has been arranged.

ROOSEVELT FIELD, L. I.—Carl de Ganahl, president, Fleetwings Inc., manufacturer of parts for airplanes, has purchased the 31-acre plant of the Keystone Aircraft Corp., at Bristol, Pa., and will transfer its operations to that place Oct. 1.

New Jersey

BAYONNE, N. J.—Electric Boat Co., 40 Wall street, New York, plans to make alterations and add to its boat-building plant here at cost of about $30,000.

BRIELLE, N. J.——Feuerbach & Hanson Boat Building Co. recently sustained damage by fire to its main building.

CLIFTON, N. J.—Bright Star Battery Co. has removed its general office and factory from Hoboken, N. J., to its newly purchased plant here, and new machinery is being installed.

Pennsylvania

BRADENVILLE, Pa. — Atlantic Crushed Coke Co. is rebuilding its plant recently destroyed by fire, to be completed about Oct. 1.

McCLELLANTOWN, PA. — Puritan Coke Co. is planning to install a new crushing and sizing plant, to be ready for operation about Oct. 1.

Ohio

COLUMBUS, O.—Banner Die, Tool & Stamping Co., 1288 Holly avenue, is considering installing the latest type electric hardening furnaces with atmospheric control, in plans now under way for further expansion.

WAPAKONETA, O.—City council has plans in preparation for a municipal electric light and power plant to cost about $146,000.

WARREN, O.—Middletown Distilling Corp., 1103 Mahoning Bank building, Youngstown, O., has bought the plant of the Western Reserve Brewing Co. on Youngstown road and will remodel and re-equip it, including electric power equipment, to cost about $100,000. Charles Owsley, Home Savings Bank building, Youngstown, O., is architect.

Michigan

CHARLEVOIX, MICH. — Pearse, Greeley & Hansen, engineers, 6 North Michigan avenue, Chicago, are completing plans for erection of sewage disposal plant here to cost about $90,000.

DETROIT—Detroit Vapor Stove Co., 12345 Kercheval avenue, has been organized to do a manufacturing business, by C. D. Donaven, Whittier apartments, Detroit.

DETROIT — Detroit Steel & Wire Corp., 3730 Union Guardian building, has been incorporated to deal in iron, steel, etc., by Glen R. Miller, 3730 Union Guardian building.

DETROIT — Michigan Machinery Sales Inc., 2990 Waverly avenue, has been incorporated to do general manufacturing, by Clarence E. Barr, 2990 Waverly avenue.

DETROIT—An engineering investigation and report on Wayne county's proposed $23,000,000 PWA sewage disposal project has been ordered by Washington officials, it was announced by Dean Mortimer E. Cooley, state PWA engineer.

DETROIT—G. A. Mueller, 1346 Broadway, architect, is completing plans for a malt plant, including malt house, grain elevator, dry kiln and power plant at Dix and Vernor highway, Dearborn, Mich., for the American Malting Co. Nadell Bros., Detroit, have general contract.

LAPEER, MICH.—Lapeer Tool & Mfg. Co., 93 Howard street, has been formed by D. W. Oviatt, 13501 Dexter boulevard, Detroit, and associates, to manufacture tools, jigs and machinery.

MONROE, MICH.—City has approved the contract with PWA under which $533,000 is to be made available for construction of sewage disposal plant, $149,000 being a direct grant from the government.

PORT HURON, MICH.—Basshead Ale & Brewing Co. has purchased the Albert B. Parfet Co.'s building here and will spend $50,000 to remodel it for manufacture of beer and ale.

STANDISH, MICH. — City, S. E. Graves clerk, plans construction of a waterworks system to cost about $53,000, for which PWA financing has been approved. Bruce Buchanan Inc., Pontiac Bank building, Pontiac, Mich., is engineer.

ST. JOSEPH, MICH.—Upton Machine Co. is taking figures for construction of a $40,000 storage building.

TECUMSEH, MICH.—Hillsdale Mfg. Co., Hillsdale, Mich., has acquired the factory building of H. Brewer & Co., Tecumseh, Mich. Remodeling of the Tecumseh plant will be under way shortly and probably will be occupied by the last of October by the new owners. Considerable new equipment will be purchased.

WYANDOTTE, MICH.—Marx Brewery Co., Helmar Knudsen president, will install electric power equipment in extensions to plant and new mechanical bottling works, total cost to be about $200,000.

Indiana

BATESVILLE, IND.—City plans construction of a sewage disposal plant to cost about $46,000 for which PWA loan is being sought. C. Brossman, 1009 Chamber of Commerce, Indianapolis, is engineer.

GOSHEN, IND.—Bids will be taken soon on a sewage treatment plant and intercepting sewer, to cost $455,000 for which PWA aid is approved. Bemis & Co., 105 West Adams street, Chicago, are engineers. R. Wheeler is city engineer.

INDIANAPOLIS — Arup Mfg. Co., manufacturer of flying-wing aircraft, has moved its production from South Bend, Ind., to 1428 East Nineteenth street, Indianapolis.

KENDALLVILLE, IND. — City is making plans for construction of a sewage disposal plant to cost $71,500 on

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PWA funds. C. Hurd, 1039 Architects building, Indianapolis, is engineer.

Illinois

CHICAGO—Hollup Corp., 3333 West Forty-eighth place, plans construction of a 1-story addition to cost about $40,000. A. Epstein, 2001 West Pershing road, is architect.

COULTERVILLE, ILL—City plans construction of a waterworks plant and system, including a motor-driven and a gasoline engine-driven pump of 500 gallons per minute capacity each. PWA loan of $140,000 is pending. Russell & Axon, 4903 Delmar boulevard, St. Louis, are engineers.

EDWARDSVILLE, ILL.—Bids have been delayed until Sept. 20 on a sewage disposal plant to cost $70,000 for which a PWA loan has been approved. Sheppard, Morgan & Schwaab, Alton and Edwardsville, Ill., are engineers.

HEYWORTH, ILL.—Bids will be received Sept. 20 by the village for construction of a waterworks plant to cost about $68,000. Warren & Van Praag, Millikin building, Decatur, Ill., are engineers.

NOKOMIS, ILL.—Bids will be taken about Jan. 1 for a waterworks plant and distribution system for which $45,000 has been allotted by PWA. J. J. Woltman, Bloomington, Ill., is engineer.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Sept. 21, schedule 3320, one motor-driven surface grinder; schedule 3321, eight motor-driven horizontal milling machines; schedule 3322, two motor-driven spline milling machines, all for delivery at Newport, R. I.; schedule 3323, one motor-driven toolmakers' lathe, delivery Norfolk, Va.; schedule 3324, one motor-driven milling machine, delivery Norfolk, Va.; schedule 3325, motor-driven shaft turning lathes; schedule 3326, three two spindle drilling machines; schedule 3327, three automatic screw machines, all for delivery at Newport, R. I.; Sept. 25, schedule 3308, 200 aircraft manifold pressure gages, delivery Philadelphia; schedule 3309, three automatic gyroscopic pilots, delivery Santa Monica, Calif.; schedule 3310, one motor-driven buffer and grinder; Sept. 28, schedule 3311, three electric hoists; schedule 3355, motor-driven, floor-type, spindle drilling, high speed machines, delivery Washington.

Georgia

MACON, GA.—Superior Court Judge L. L. Brown has confirmed sale of the Schofield Iron Works, Macon, Ga., to the Taylor Iron Works & Supply Co., Macon, Ga., for a sum reported as $40,000.

MANCHESTER, GA.—Board of commissioners, T. H. Davis, chairman, opens bids Sept. 28 for sewage disposal plant, including Imhoff tank, sludge drying beds, screen chamber, 4500 feet of 12-inch outfall sewer, 3000 feet of 6-inch iron pipe line, and 1000 feet of 8-inch iron pipe line. Wiedemann & Singleton, engineers, Candler building, Atlanta, Ga.

Kentucky

CHICAGO, KY.—Blair Distilling Co., 1820 David Stott building, Detroit, plans establishing a 3 and 4-story distilling plant here, to include machine shop, power house, etc., and will cost about $100,000. Thomas J. Noles, architect, Kentucky Home Life building, Louisville, Ky.

Maryland

BALTIMORE — Medcalfe Distillery, 807 Key highway, has been incorporated by Herbert C. Medcalfe, Kinloch N. Yellott and John R. Barnwell.

CURTIS BAY, BALTIMORE—Barney Ahlers Construction Corp., 110 West Fortieth street, general contractor for plant alterations for United States Industrial Alcohol Co., will soon receive sub bids. Work includes general renovations of 12 buildings.

Virginia

RADFORD, VA.—Appalachian Electric Power Co., 1300 Electric building, Richmond, Va., plans hydro-electric project on New River near Radford.

Missouri

HAYTI, MO.—City, J. H. Wilks, mayor, will soon ask bids for construction of filter plant and water extensions. W. A. Fuller Co., 2916 Shenandoah street, St. Louis, is engineer.

ST. CHARLES, MO.—City has voted $65,000 bond issue for extension and improvements to waterworks, of which $40,000 will be used for erecting filtering plant, and balance for improving present plant.

ST. LOUIS—Sterling Lighting Co., 118 Delmar avenue, manufacturer of lighting fixtures, plans construction of a new plant, 1½ stories, to cost about $30,000. John D. Paulus, 4729 Northland avenue, St. Louis, is architect.

ST. LOUIS—Carter Carburetor Corp. will spend more than $150,000 in 1934-35 for additions to its local plant. The first addition, to cost $50,000, will be started soon. Next year a four-story reinforced concrete addition, costing $100,000, will be built. The addition will be erected on property already owned by the corporation and will supply additional engineering and service facilities.

Arkansas

TUCKERMAN, ARK.—Town, Judson N. Hout Sr., mayor, will receive bids Sept. 25 for construction of complete waterworks system, including elevated tank, pump house, booster pumps, etc.

Texas

AUSTIN, TEX.—City, Guiton Morgan, city manager, received bids Oct. 3 for settling basin, 4,000,000-gallon capacity, alterations to old boiler house, repairs and improvements to electric plant, etc. Hawley, Freese & Nichols, engineers, Capps building, Fort Worth, Tex.

AUSTIN, TEX.—Eugene V. R. Thayer, bondholder of old Central Texas Hydroelectric Co., has obtained PWA loan of $4,500,000 to complete Buchanan dam, 60 miles northwest of here on Colorado river. Fegles Construction Co., Minneapolis, was contractor for finished portion of work.

BOWIE, TEX.—City plans installing waterworks, including seven miles of cast iron water pipe, filter purification plant, etc. T. J. Wright, mayor; Municipal Engineering Co., Athletic Club building, Dallas, Tex., engineer.

FAIRFIELD, TEX.—City has plans in progress by H. B. McAllister, engineer, 914 Washington avenue, Waco, Tex., for waterworks system; loan and grant of $123,000 has been approved by PWA.

Wisconsin

CEDARBURG, WIS. — Cedarburg Brewing Co. has been incorporated with $10,000 capital to operate brewery, by Joseph Gesell, William Gesell and Otto Stifter.

FREDERIC, WIS.—Bids close Sept. 21 with water department for extensions

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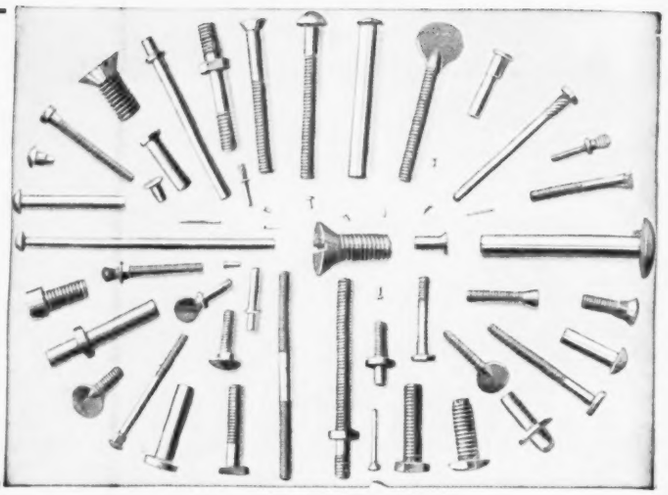

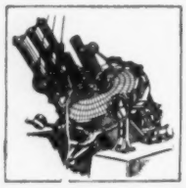

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and other improvements estimated to cost $24,500. (Noted July 30.)

HARTFORD, WIS.—Ben Beznor & Co. has been incorporated to do general business in scrap iron, metals, etc., by D. Beznor, M. Weiss and L. Beznor.

HARTFORD, WIS.—Elliott Co., 20 North Wacker drive, Chicago, is low bidder at $40,861 for furnishing city light and power plant one 750-kilowatt automatic extraction type turbine generator unit.

MANITOWOC, WIS.—Public utilities commission is taking bids until Sept. 27 on one 5000-kilowatt steam turbo-generator and auxiliaries, for the municipal light and power plant.

MILWAUKEE—Fred Miller Brewing Co., 4000 West State street, has broken ground for a boiler house, 57 x 85 feet, costing $135,000, of which $97,000 is for equipment.

MILWAUKEE—Allis-Chalmers Mfg. Co. has received an order valued at $370,000 for mercury arc rectifiers, transformers and switch gears for two sub-stations for electric railway on the new Delaware river bridge connecting Philadelphia and Camden, N. J.

TREMPEALEAU, WIS. — Major Dwight F. Johns, district engineer, war department, 615 Commerce building, St. Paul, will receive bids until Oct. 2 for construction of dam No. 6 in Mississippi river, near Trempealeau, which will require about 1500 tons of various forms of steel.

WAUWATOSA, WIS.—A referendum on the question of building a municipal gas plant will be held Nov. 18 by order or common council. Preliminary plans estimate cost at $1,348,000. W. T. Whip is city clerk.

Minnesota

ALEXANDRIA, MINN.—Sam Caldis and John Gianopolis are having plans made for a 44 x 88-foot, 10,000-barrel capacity brewery to cost $60,000. Complete new brewing machinery and equipment will be installed. Burlingame & Hitchcock, Sexton building, Minneapolis, are consulting engineers.

CROOKSTON, MINN. — Crookston Foundry Co. has been purchased by H. V. Albertson, Fertile, Minn., and H. Monson, Fargo, N. Dak. Mr. Monson has been associated with the Fargo Foundry Co., Fargo, N. Dak., for 15 years. Mr. Albertson formerly operated a foundry at Fertile.

MELROSE, MINN.—City will purchase pumping equipment for municipal waterworks. G. B. Rehkamp is city clerk.

MINNEAPOLIS—A. E. Jacobson Machine Works, 1086 Tenth avenue, Southeast, manufacturer of automatic coal stokers, etc., has started construction of a 1-story, 30 x 50-foot addition to its plant.

MINNEAPOLIS—Mason Furnace Co., 2949 Lyndale avenue, South, is planning to add a complete fuel department to its present business, which includes heating and air conditioning equipment.

MINNEAPOLIS—Shedd-Brown Mfg. Co. has been incorporated with capital stock of $250,000 to manufacture advertising specialties and novelties, by Hugh E. Shedd, Harry M. Brown, and H. Franklin Shedd.

ROCKVILLE, MINN. — City plans construction of a 50,000-gallon capacity water tank and tower, pump house, 8000 feet of 4 to 8-inch water mains, also 250-gallon per minute pump. N. A. Weisman is village clerk. M. B. Lang, St. Cloud, Minn., is engineer.

ST. PAUL—Joseph Dingle Boat Works, F. W. Dingle, proprietor, 596 Texas street, manufacturer of boats, has started construction of a 1-story, 40 x 50-foot boat manufacturing plant.

ST. PAUL—J. S. Kapuseinski, FERA purchasing agent, 478 St. Peter street, St. Paul, will receive bids until Sept. 19 for two low-speed diesel engine AC generating power plants for Camp Mendota and Camp Savage.

ST. PAUL—Seeger Refrigerator Co., Walter G. Seeger, vice president, 850 Arcade street, manufacturer of refrigerators and refrigerator cabinets, is having plans made for an addition to its factory, 83 x 204 feet, and a third story addition to its metal shop, 44 x 200 feet. C. H. Johnston, 360 Robert street, is architect.

North Dakota

FARGO, N. DAK.—City council, Carl O. Jorgenson, city auditor, will receive bids until Sept. 27 for sewage disposal plant, sewer interceptor system and building over trickling rock filter, to cost $785,000. Buell & Winter Engineering Co., 503 Insurance Exchange building, Sioux City, Iowa, engineer.

GRAFTON, N. DAK.—Board of education, J. E. Grey, secretary, will soon receive bids for construction of a 2-story high school building, 85 x 131 feet, to cost $130,000, and will include manual and industrial training departments. John Marshall, Devils Lake, N. Dak., and N. W. Fisher, St. Cloud, Minn., are architects.

OAKES, N. DAK.—City plans construction of a sewage disposal plant to cost about $25,000. H. E. Dady is city auditor.

Iowa

CEDARBURG, IOWA—Heating Unit Corp. has been formed by J. Rademacher and associates with $100,000 capital, to manufacture heating equipment and electrical devices.

CLARION, IOWA—City will take bids soon on a sewage disposal plant, including pumps, to cost about $28,600. PWA grant of $10,000 has been approved. Buell & Winter Engineering Co., Sioux City, Iowa, is engineer.

OSKALOOSA, IOWA—Carl Mayer, secretary of the board of waterworks trustees, will receive bids until Sept. 29 for soft water plant to cost $100,000, including new raw water pumping station with necessary equipment and new chemical storage house and water softening tanks with necessary equipment.

ROCKWELL CITY, IOWA — City council plans construction of a new waterworks pumping plant with diesel engine operated pumping units to handle about 5000 gallons per hour, to cost about $25,000.

Kansas

HOISINGTON, KANS.—City council plans construction of municipal electric light and power plant to cost about $150,000, including equipment. W. B. Rollins & Co., Railway Exchange building, Kansas City, Mo., are engineers.

Nebraska

LINCOLN, NEBR.—Cushman Motor Works has been incorporated with capital stock of $99,000 to manufacture industrial and farm gas engines, by Charles D. Ammon, J. F. Ammon, E. B. Ammon, Hugh L. Sherwood and W. M. Stoner.

Pacific Coast

BALDWIN PARK, CALIF.—Worswick-Mellin-Culver Co., 419 West Main street, El Monte, Calif., has prepared plans for construction of a paint factory to be erected for D. V. A. La Monte.

BARSTOW, CALIF.—Combined Gold Producers Syndicate Inc., New York, is planning to erect a milling plant and smelter here. Frank Buck, Barstow, Calif., is engineer.

COLTON, CALIF.—Currie Engineering Co., Anderson Block building, has completed plans for sewage treatment plant to be erected here, at a cost of $40,000, under a PWA loan and grant.

LOS ANGELES—William Richards and Wesley Eager, architects, 606 Architects' building, are preparing plans for reconstruction of shop building at Jacob A. Riis high school, to cost about $25,270.

PASADENA, CALIF.—Frederick Kennedy Jr., architect, has prepared plans for reconstruction of shop buildings at Washington Junior college, to cost approximately $18,000.

SALINAS, CALIF.—Sam Trondhjem, 45 Geil street, has contract for construction of a 1-story frame auto shop to be built for the Salinas Union high school. Charles E. Butner, 51 Maple avenue, is architect.

SAN DIEGO, CALIF.—Preliminary plans have been made for the installation of a diesel operated electric power plant for the city of San Diego. Cost of project is estimated at $150,000.

SELMA, CALIF.—Shop building and equipment of Selma Union high school was recently destroyed by fire. George Howden is principal of school.

CHEHALIS, WASH. — Machinery, hoists and equipment of Foron Bros. Ford Prairie coal mine were destroyed by fire recently.

OKANOGAN, WASH.—Plans are being prepared for waterworks improvements to cost $15,000.

Dominion of Canada

WINNIPEG, MAN.—Wings Ltd., I. J. R. Deacon, president, plans construction of an airplane manufacturing plant to cost about $50,000.

WINNIPEG, MAN.—City council W. P. Brereton, city engineer, has voted $25,000 for investigation into methods of sewage disposal. W. S. Lea, 1226 University street, Montreal, Que., engineer, has been engaged to make survey.

TORONTO, ONT.—Standard Underground Cable Co., Hamilton, Ont., a subsidiary of the Canada Wire & Cable Co., has bought four buildings at Leaside, Toronto, Ont., and will transfer its manufacturing operations there. Buildings have 136,000 square feet of floor space.

WELLAND, ONT.—Canada Foundries & Forgings Ltd. is having plans made for an addition to its foundry to cost about $60,000.

MONTREAL, QUE.—Electric Tamper & Equipment Co. of Canada Ltd., F. C. Dobell, president, plans construction of a plant to manufacture engines, machinery, and similar products, to cost about $50,000.

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